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OF

MISCELLANEOUS INFORMATION.

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CCCCLIII.—SUGAR-CANE DISEASE IN BARBADOS.

The rind-disease in sugar-cane (*Trichosphaeria Sacchari*, Massee) was described in the *Kew Bulletin*, 1893, p. 149. The root-disease (*Colletotrichum falcatum*, Went) was discussed in *Kew Bulletin*, 1893, p. 347. Subsequent investigation has shown that these are different forms of one and the same disease. The treatment of the fungoid and insect pests affecting sugar-cane in the West Indies was published in *Kew Bulletin*, 1894, p. 167. Since that time the subject of cane diseases has occupied a good deal of attention, but it can hardly be said that anything has actually been done to meet the danger which seriously threatens the sugar industry in the West Indies. The latest information to hand is contained in a Report of the Commission appointed by the Governor of Barbados (Sir James Shaw Hay, K.C.M.G.) to inquire into and report upon the best means of destroying the Borer or any other pest affecting the sugar-cane. The Borer here mentioned is the grub of a moth (*Chilo saccharalis*), figured in *Kew Bulletin*, 1892, p. 153; and fully described with remedial measures in *Kew Bulletin*, 1894, pp. 172-175.

From this Report the following extracts are taken:—

THE RIND FUNGUS.

In riding round the margin of a canefield, canes infected with the rind fungus are first noticed by dark red or brown marks, in one or two joints towards the middle or base of the cane. These marks are easily distinguished from sun-burn because of their diffused character, indistinct edges, and by its being evident that they are not mere surface stains, but that the tissues beneath are affected. This "Red patch" on the canes is first noticed in July, and from October onwards gradually becomes more and more abundant up to the time of the ripening of the canes. It is by no means found only in poor looking canes, but is often present in fine looking plants. This red patch having made its appearance, rapidly spreads upwards and downwards, the infected area darkens in appearance, and is evidently rotten. Little black specks make their appearance, breaking from the inside to the surface of the cane, being first seen in the sleeping roots near the joints, and then at the parts of the cane between the joints, finally the cane shrivels and dries up.

The result of this disease is that canes which if they had remained healthy would have given a large yield of rich juice, are found to be absolutely valueless, and so far from themselves yielding sugar, their presence amongst crushed canes actually leads to a marked deterioration of the juice and of the sugar manufactured therefrom, as well as to a diminution in the quantity of the sugar obtained.

This disease is present in probably every canefield in the island, and the total crop of 1894 is clearly found to be very seriously diminished by it. And your Commission have formed, after the most careful consideration, the very disquieting opinion that if it be left unchecked the cultivation of the sugar-cane will be rendered unprofitable, and therefore extinct in this island. With the present outlook as regards prices and production, it is evident that if sugar-cane cultivation is to remain the staple of the island, large crops must be maintained at a minimum cultivation cost, and this cannot possibly be accomplished in the presence of any serious amount of disease.

RIND FUNGUS AND MOTH BORER.

From the appearance it would seem that the rind disease in at all events a large number of cases started from the burrow of the Moth Borer. It would seem that in Barbados up to say December in each year the fungus makes an entrance into the cane at spots injured by the Moth Borer, which must therefore be looked upon as a very serious insect pest.

From January onwards, however, an increasing number of canes will be found attacked by rind fungus, and without any signs of Borer whatever. From a careful examination of such canes it would appear that the attack had started from the middle or base of the cane as the fungus is most mature there, first sending out the black specks (which are spores or seeds) in those portions. These cases of canes attacked by fungus alone are very serious, because they increase with the ripening of the cane, and in March and onwards become so numerous that they constitute, we think, a large majority of the diseased canes. These canes are frequently found red from end to end and rotten or dry and shrivelled up from end to end without any sign of Borer whatever. It would appear from Mr. Massee's very comprehensive and able paper that the fungus in such instances must have effected an entrance at the ragged bases of the old leaves which have been torn or broken off. The above facts show the fungus to be a pest which can by itself and without any previous insect injury attack the cane; consequently a pest to be dealt with in addition to any measures which might be adopted to exterminate the Moth Borer.

ROOT FUNGUS.

For the present we leave the subject of rind fungus to deal with that of "*root fungus*" so called; specimens of which have also been examined and reported upon by Mr. Massee, who determined it to be a fungus known as *Colletotrichum falcatum*, a species recently described by Dr. Went as injuring the canes at Java.

The characteristics of this disease, as far as we have examined it, are as follows:—

- (1.) It was at first confined for the most part to the higher red soils of St. John, having only appeared in small patches in a very few other places but has since spread in spots all over the island.

- (2.) The effect of this disease is that the canes appear to receive a check in their growth about June and July after planting; the plant dwindles down, fresh basal shoots are formed to supply the place of the dying ones, but notwithstanding this it is ultimately found that growth has been arrested and no cane formed; and if the plant be dug up the roots are nearly all dead; and those that are still living are dotted over by little red spots. The dead roots are also often covered by mildew.
- (3.) Such canes yield practically no sugar, and the crop of a thoroughly diseased field is practically nothing.
- (4.) There seems to be some resemblance between this disease and the Sereh of Java. In the latter disease we have the same retardation of growth, and shortness of joints, a great number of dead roots, an attempt to throw out new shoots from the stool to replace those above that are dead. In Sereh, as in the St. John's disease, there is a gradual dying away of the plant after the commencement of the rainy season.

The one characteristic (histological) of Sereh is the presence of a gelatinous substance, slime or gum, in the fibro-vascular bundles of the cane, giving the parts attacked a red colour.

It has been finally decided at Kew. that *Colletotrichum falcatum*, Went, is simply one phase in the life history of *Trichosphaeria Sacchari*, Mass., and that the phenomena above described are the effects of that particular phase of the disease.

SELECTED CANE PLANTS.

It is difficult to form a decided opinion with regard to the part played by carelessly selected cane plants in propagating rind fungus. The attack appears so late in the life of the cane that it is difficult to suppose that careless selection has been the direct cause of the presence of fungus spores. It is almost equally difficult to speak with regard to the propagation of Moth Borer. This insect, as well as the fungus, appears to be more prevalent in the low than in the high lands, and it may be that the better shelter from winds in the former districts enables it to settle more effectively and prevents dispersion. On the other hand, in recent years it often happens on every estate that a larger or smaller number of cane plants fail to germinate or die off almost immediately after germination.

At all events, in some cases this is due to diseased plants, and it seems exceedingly probable that the high number of supplies on some estates has been partly due to that cause. The disease is sometimes due to the Moth Borer and sometimes due to fungus. In this connexion an interesting experiment is recorded by a planter of this island, who planted 2900 healthy Keni Keni plants from a healthy field, and 2850 Keni Keni plants selected carefully by labourers from a diseased field, trying to get only healthy plants from this field. The result was 2850 germinated in the first case, and only 50 germinated in the second case. One estate in the island took 80,000 plants to supply 77,000 holes. These instances, in our opinion, show one of the effects of planting diseased canes, another effect being, according to Kew experiments, to produce the root form of the disease.

The careful selection of plants has been urged not only in Barbados, but in every cane-growing country where disease has led to careful investigation, and the practice of indiscriminate selection of plants has

been universally condemned. There can be no doubt that while we have not sufficient evidence to warrant us in ascribing the October rind fungus to this source, it must yet be a very prolific source of all the diseases which occur in the early life of the young cane; it may possibly be the means whereby root fungus is spread, and is certainly a means of propagating the Moth Borer.

CHANGE OF VARIETIES OF SUGAR CANES.

Has the continual propagation of one variety led to degeneration? There is no evidence upon this point beyond the impression left by a comparison of the Bourbon with other and with seedling varieties. Analogy teaches us that direct propagation from seed is the one most likely to maintain a vigorous species, and that although by propagation from cuttings we may gradually modify a plant to develop richness in some one respect and to maintain some one quality, yet a gradual decrease of general vitality may result, and a want of adaptation to surrounding circumstances. The production of plants from seeds possesses advantages of maintaining vitality, of adaptability to surrounding conditions, and of lending itself to the production of new qualities.

General experience in other countries shows, on the one hand, that a change of varieties is an effectual way of combating plant diseases. Thus Mauritius is reported to find a constant change of great value, Queensland is said to have greatly mitigated the ravages of the rust by this method, and lastly, there is an ever-increasing store of evidence of the most reliable kind to show that there are several varieties of cane in Barbados (including some seedling canes) which possess a striking though not complete immunity to fungoid attack.

The following biological consideration leads to the same view, that where one variety of plant is cultivated to the practical exclusion of all others, that all the parasites of that plant enjoy the very best conditions for their continuous propagation and increase. Or to reduce this generality to our special case, that continuing to plant the Bourbon cane is to provide a continuous supply of material for the rind fungus to grow and increase upon. Change the variety, and the parasite exists with much greater difficulty or has to change its habits.

The fact that both the rind fungus and the root fungus are so much less liable to attack certain varieties of the cane other than Bourbon cannot fail to be a fact of immense value.

Your Commission after very careful inquiry not only found that certain varieties of canes strongly withstand both root and rind fungus, but the record also shows that at all events in some places these varieties are very profitable to cultivate, and your Commission most strenuously advocates that the cultivation of these varieties should be extended in every direction, cultivating in each district the variety which proves most fitted for it. During the last few years the diseases which attack the Bourbon sugar-cane have steadily increased in amount, and the history of like cases points to the belief that this increase will go on and not abate until some very serious measures are adopted; and amongst them we consider the cultivation of new varieties as one of the most promising. With the present prospect as regards price of sugar the whole industry can only exist by the strictest economy in cultivation and manufacture; and with any serious amount of disease, cultivation must cease to be profitable. Undoubtedly if the progress of the present disease in Barbados cannot be checked, the island is doomed to ruin. And all considerations point to the conclusion that the whole island

must be ready to abandon if necessary the cultivation of the Bourbon variety. Your Commission recommends that every estate should be ready by having such an amount of cane varieties planted as will serve to supply, if occasion demands, a sufficiency of plants to plant the whole estate in those varieties.

SERIOUS CHARACTER OF THE ATTACKS OF THE MOTH BORER.

Moth Borers of one kind or other have been recognised as destroyers in every sugar-producing country; in India, Mauritius, Java, and other East Indian islands; in Queensland, Louisiana, and all over the West Indies. The Mauritius disease, which was investigated in 1848 by a Government Commission, was of this nature, and your Commission have come to the conclusion that *Diatraea Saccharalis* is by far the most serious insect pest in this island, and in the months of October to December by its injuries to the sugar-cane enables the spores to effect an entrance and attack canes in a manner which at that time of the year would not otherwise occur. Various observers who have written upon the subject have held the view that this insect was the parasite most to be feared.

Of all insect enemies of the sugar-cane the Moth Borer is certainly the most serious one in Barbados. It attacks all varieties of canes and hence is not only constantly exposing them to the attack of fungi or bacteria, but would in many cases carry the very spores into its burrows, besides which, the injury suffered by any cane by the actual attack at least leads to impoverished juice, if not to actual death of the plant. A glance at any of the literature of the cane diseases will convince any one of the importance which every cane-growing country has attached to checking the spread of this pest. And a very interesting compilation upon the subject was made by Mr. T. D. A. Cockerell, late of Jamaica. The remark of the Rev. L. Guilding has not to the present day been disproved that the Moth Borer is the most destructive and common insect enemy of the sugar-cane. As Mr. Cockerell remarks, "no one can doubt that in these days of severe competition, when sugar is by no means as profitable as formerly, a comparatively small gain or loss, much less than that enumerated by Mr. Van Patten, may make all the difference between success and failure." The same insect-specialists also say that the application of insecticides as manures to the soil is not applicable to the present case "as the life history of *Diatraea Saccharalis* is well known and there is no reason to suppose that at any stage it lives in the soil."

REMEDIES AND RECOMMENDATIONS.

1. That a strong central committee of planters and others who represent the interest of the Island as proprietors and attorneys, and who are favourable to remedial measures, be appointed to see that these measures are carried out.

2. That from this central committee the planters from each parish, together with some from the adjoining ones, compose a sub-committee for that parish; the duties of this sub-committee being to keep the parish under a thorough inspection and to see that all measures are continually and thoroughly carried out.

3. That all plants before planting be soaked in Queensland solution* or other solution which the Island Professor of Chemistry, with the approval of the central committee, certifies to be equally efficacious.

* One pint of carbolic acid to 160 gallons of water.

4. That wherever deemed possible by the sub-committee the practice of spreading trash around young canes be given up; and that wherever it be resorted to only trash from a field which has been inspected by the sub-committee and declared healthy, or as healthy as possible, be employed.

5. The rotten canes on all fields diseased with rind fungus and "root fungus" should be burnt on the field, or crushed and burned as herein-before mentioned. In fields diseased with root fungus the stumps should be dug up, the mould shaken off, and be allowed to dry and be burned or buried.

6. That rotten canes on all fields be regularly burned during the crop. Juicy ones could be first crushed and the megass burned, the juice being boiled.

7. That the trash used as litter be taken from fields which are healthy or as healthy as can be got.

8. That each estate put such an area under the so-called hardy varieties of cane plants as will suffice to re-plant the whole of the estate in those varieties if necessary.

9. That when root fungus has made its appearance, ratooning for the present should be gradually given up.

10. That the canefields be periodically inspected, with a view to cutting out canes infected with Borer or fungus, which canes should be bagged upon the spot and taken away, crushed and burned.

11. Rotation of crops should be especially resorted to in the case of root fungus.

GEORGE C. PILE,
President of the Commission.

The following documents carry on the history of the subject:—

NOTE by Mr. MASSEE on the *Melanconium*-stage of *Trichosphaeria Sacchari*.

Specimens of diseased sugar-cane were sent to Kew in 1878 from Porto Rico for investigation. These were submitted to the Rev. M. J. Berkeley, who gave the MS. name of *Darluca melaspora* to the fungus present on the canes. The fungus was afterwards very briefly described under Berkeley's name by Cooke in *Nuovo Giornale Bot.*, vol. x., p. 26 (1878), who incorrectly gave the locality as Australia instead of Porto Rico. Saccardo has added to the confusion by changing the name to *Coniothyrium melasporum*, and in quoting Cooke's diagnosis incorrectly in *Syll. Fung.*, vol. iii., No. 1799.

Finally, Prillieux and Delacroix, in their paper on sugar-cane diseases (*Bull. Soc. Mycol. de France*, tom. xi., p. 75, 1895), have fallen into the error of considering the *Melanconium* stage of *Trichosphaeria Sacchari*, Mass., to be synonymous with *Coniothyrium melasporum* (Berk.) Sacc. Examination of Berkeley's type specimen shows that the fungus is a *Diplodia*.

GOVERNOR OF BARBADOS to COLONIAL OFFICE.

Government House, Barbados,

MY LORD MARQUESS,

19th February 1895.

WITH reference to your Lordship's Despatch, No. 131, of the 15th December last, respecting the action of the House of Assembly with

regard to the Bill dealing with the sugar-cane diseases, I have the honour to state that having brought to its notice your Lordship's correspondence with the Governor of Trinidad, it was resolved not to proceed further with the proposal to obtain the services of an expert, and the joint committee of both branches of the Legislature to which my draft Bill had been referred, after due deliberation, with slight modifications adopted it. I anticipate that it will be considered by the House of Assembly at its next meeting, and enclose a copy for your Lordship's information.

2. I also transmit a copy of a report, rendered by Mr. Bovell at my request, on the fungus disease amongst the canes, which I regret to say appears to be still spreading, and in forwarding copies to the Legislature, I have once again invited serious attention thereto.

3. As being germane to the subject, I likewise attach a copy of the report of a commission nominated by me in January 1893 "to inquire into and report on the best means for destroying the Borer and other pests affecting the sugar-canes," which I have just received, and which has this day been laid on the table of the House. It is, I think, interesting to note that the conclusions arrived at are very similar to the recommendations of the Director of the Royal Gardens, Kew, which are in the main embodied in the draft Bill dealing with the question.

I have, &c.

(Signed) J. S. HAY.

The Most Hon.

The Marquess of Ripon, K.G.,

&c.

&c.

&c.

[Enclosure.]

REPORT on the SUGAR-CANE FUNGUS (*Trichosphaeria Sacchari*, Mass.) at present existing in the ISLAND.

Although I knew of the existence of what is known as the root fungus, one of the forms of the polymorphic *Trichosphaeria Sacchari*, Mass., and had obtained permission to plant a hardy variety of the sugar-cane in a badly affected field on Henley estate, in the parish of Saint John, so as to ascertain whether the hardier varieties would be less likely to suffer from the root fungus than the Bourbon cane, it was not until December 1891 that my attention was drawn to the rind fungus, another form of the same *Trichosphaeria*, by Mr. Hutson, the manager of Sunbury estate, who asked me to tell him what was the matter with certain holes of canes in a field, some of which were dying, and from that time onwards the two forms of the fungus have spread rapidly until now, February 1895, there is hardly an estate which is not more or less affected.

2. In many instances so badly has the disease attacked the canes that instead of an acre giving from two to three hogsheads of sugar it will require many acres to give one hogshead.

3. Since my return to the colony I have not as yet, owing to press of other work, been able to visit the whole island, but in the parishes that I have been, viz., St. Philip, St. John, St. George, and portions of Christ Church, St. Thomas, St. Michael, and St. Andrew, I am decidedly of opinion that, taking the two forms together, there is more of the disease than there was at this time last year. Owing to the dry weather experienced during the earlier part of last year the stems of the

canes have been in a great measure protected by the leaf-sheaths up to a later period than is usually the case, consequently so many canes have not yet been killed by the rind fungus as there were at this time last year, but it is now greatly on the increase. On the other hand, there is very much more root disease apparent; this is, in my opinion, due in a great measure to the spores of the rind fungus being worked into the soil in the process of cultivating it, and to, in many instances, plants containing the fungus being used for replanting the estates. On some of the estates where I knew the tops of canes affected with rind fungus were used as plants last December year, the fields are now, as was to be expected, badly diseased. On the other hand, it is with much pleasure that I note on those estates where hardy varieties were planted, and, in some instances, the recommendations of the authorities at Kew carried out on fields badly affected last year and the year before, there is a marked improvement, and if all the planters were to do what has been found so successful on the estates to which I refer, I have not the slightest doubt but that in a few years the disease will have nearly, if not entirely, disappeared, but so long as there are planters who take plants from diseased canes, as some have done up to quite recently, so long will the disease continue to give trouble, and occasion considerable loss.

(Signed) JOHN R. BOVELL,
Superintendent.

The Bill was thrown out in the Legislative Council, March 26, by the casting vote of the President, Sir George Pile.

CCCCLIV.—RAFIA FROM WEST AFRICA.

In the *Kew Bulletin* for 1891, pp. 1-5, an account is given of West African bass fibre, prepared from the base of the leaves of the Bamboo palm (*Raphia vinifera*). Since that time African bass has become a recognised article of commerce. The price at first was about 42*l.* per ton; it rose to 56*l.* per ton, but latterly, in competition with similar fibre from the Palmyra palm, the Kitool, and the original bass produced in Brazil, known as Para and Bahia piassaba, it has been quoted at 20*l.* to 30*l.* per ton. Even at the latter price it supports a considerable industry in West Africa.

It appears probable that the Bamboo palm may be made available also for other uses. A strong, useful material known as Raphia or Rafia is shipped to this country from Madagascar. According to the Rev. Richard Baron, F.L.S. (*Kew Bulletin*, 1890, p. 211), it is obtained "from the young unopened leaves of the Raphia palm." *Raphia Ruffia*, Mart. *Hist. Nat. Palm*, iii., p. 217 (*R. pedunculata*, Beauv.) is confined to Madagascar. It is widely spread in the island, chiefly in valleys, up to an elevation of 4000 feet. It is also found abundantly along the coast. The pinnate leaves are 20 to 30 feet in length, with numerous narrow leaflets, varying from 2½ to 5 feet long. Rafia is prepared by peeling off the cuticle (with some of the underlying fibro-vascular bundles) on one or both sides of the leaf. It is used locally for delicate plaited and woven fabrics, cloths, and hats, as well as for mats for covering floors and wrapping up goods. More recently it has been

woven into superior matting, tastefully coloured, and used instead of tapestry for covering walls in London houses. The loose strips of Rafia are in demand in this country and elsewhere in place of Russian or Cuban bast as tie-bands by gardeners and nurserymen. For the latter purpose the strips are usually loosely plaited in hanks $1\frac{1}{2}$ to 3 pounds in weight, made up into bales weighing $1\frac{1}{2}$ to $5\frac{1}{2}$ cwt. Each strip is a straw-coloured flat band about 4 feet long, and about $\frac{1}{2}$ to $\frac{3}{4}$ inch wide, but capable of sub-division into fine threads.

Owing to the French expedition to Madagascar, Rafia has already shown an advance in price. It was sold recently at 55s. per cwt. Apart from this, however, there is apparently a steady demand and a good price for Rafia fibre.

Raphia Ruffia is closely allied to the Bamboo palm of tropical Africa. If the supply of Rafia from Madagascar were greatly reduced or cut off, it is very probable that within a short time it would be possible to obtain an almost identical article from West Africa. One of the first notices of a Rafia from this part of Africa is contained in the Report by Mr. C. F. Cross, F.I.C., on the Miscellaneous Fibres shown at the Colonial and Indian Exhibition 1886. Mr. Cross mentioned that this was so closely similar to Rafia "as to be applicable to precisely the same uses." The following particulars were given:—

"Grass (epidermal strips of *Raphia vinifera*). Exhibited by Mr. A. Sibthorpe in the Sierra Leone Section, with specimens of straw plait illustrating its more usual application by the natives. This specimen also proved itself on analysis to be worth the attention of paper makers. The following determinations were made:—

Moisture	-	-	-	-	9.8 per cent.
Ash	-	-	-	-	2.7 "
Cellulose	-	-	-	-	60.8 "
Ultimate fibres.	Length	-	-	-	1.5 to 2.5 mm.

"It is needless to say that the raw material is particularly clean; in length of fibre, but more especially in yield of cellulose, it is superior to Esparto; it only remains, therefore, to determine the cost of production, and if within the limit, to introduce this raw material into European commerce. A further examination of this substance comparatively with Rafia, which still commands a high price amongst gardeners and nurserymen, showed that it was so closely similar as to be applicable to precisely the same uses, and such an application would, of course, take precedence of that above indicated. This fibrous material is well worthy of further attention.

"I have received from Messrs. Joynson satisfactory reports upon the papers made from the Rafia strips exhibited in the West African Section. They were treated by the (basic) sulphite process, and bleached to a good colour. The paper was reported to be of exceptional strength." [*Colonial and Indian Exhibition Reports*, pp. 379, 385.]

Small shipments of West African Rafia have already been made to this country. It was, however, badly prepared, and the results were not satisfactory. The strips were too short, and they reached their destination curled up so as to resemble very fine twine. It is necessary the strips should be very strong, of good length, and dried perfectly flat. Some of the best Madagascar Rafia is about $3\frac{1}{2}$ to 4 ft. long. Very exceptionally it is 5 ft. long. This shows that the long leaflets in the

middle of the frond are chiefly used and the shorter ones discarded. West African *Rafia*, to replace the Madagascar fibre, must be as long as possible, with a width of about $\frac{1}{2}$ to $\frac{3}{4}$ in., but none less than $\frac{1}{2}$ in.

If the Bamboo palm (*Raphia vinifera*) does not afford the best material for *Rafia* strips, it is possible some other species may do so. The West African *Raphias* so far known are as follows:—

Raphia vinifera, Beauv.—Bamboo palm. Abundant in West Africa, extending also to central tropical Africa, where it was found by Schweinfurth. Its distribution in Lagos is thus described by Sir Alfred Moloney (*Kew Bulletin*, 1891, p. 3):—

“The ‘Bamboo’ palm (*Raphia vinifera*), is perhaps the commonest tree in the swamps and low lands which line the waterways of the colony. Dense thickets of these palms, traversed only by the palm-wine gatherer or the bamboo cutter, push their way into the lagoons, and extend over the flood grounds, and even to a distance of from 15 to 20 miles up the river-valleys into the interior. The area occupied by these *Raphia* forests it would be impossible to calculate, but it may be accepted, without doubt, that they extend throughout the length of the colony, and to a distance of at least 15 miles from the sea coast. Over this area, of about 5000 square miles, they form a considerable proportion of the vegetation, next only in numbers to the Oil palm (*Elæis guineensis*) and the Mangrove (*Rhizophora mucronata*). The fact that one can steam for miles, as I have frequently done, through uninterrupted *Raphia* groves, impresses one with the extent of the acreage which must be overrun by this graceful palm.”

Raphia Hookeri, Mann and Wendl.—The *Uhot* of Old Calabar, where it is cultivated as a wine palm. The natives also manufacture cloth from the epidermis of the leaflets. On the Sherboro, in Sierra Leone, they make hammocks from it, as well as all sorts of basket work, mats, &c. This is one of the largest of the *Raphias*, the whole plant often attaining a height of 70 feet. The fronds are 40 feet long, with leaflets 4 to 5 feet long. If in other respects suitable, this should yield *Rafia* fibre as long as the best from Madagascar.

Raphia Gärtneri, M. and W.—Apparently confined to the Spanish Island of Fernando Po, in the Gulf of Guinea. It grows from the shore up to 500 feet above the level of the sea.

Raphia longiflora, M. and W.—The only locality given by Mann for this species is the island of Corisco, off the French Colony of Gaboon. This palm is 40 to 50 feet high, with fronds 33 feet long. The leaflets are 5 to 5½ feet long and 2 to 2½ in. wide. A figure, showing the natural habit, is given in *Trans. Linn. Soc.* xxiv., t. 39.

Raphia Welwitschi, Wendl.—A new species, collected by Dr. Welwitsch, in Angola. It grows in humid places on the rivers in the interior, and especially in the district of Galungo. The epidermis of the leaflets is used by the natives in the manufacture of cloths, &c. *R. textilis*, Welw. *Apont.*, 584, n. 2, yielding also textile filaments, is apparently a closely allied plant.

Epidermal strips, somewhat similar to *Rafia*, are available from many species of palms, notably the Cocoa-nut palm and the Palmyra palm. Specimens of these are in the Kew Museum. A variety of the Palmyra palm, known in various districts under the native names of *Morintshi*, *Kelingoos*, *Run*, and *Sibboo*, is well known to be abundant in West Tropical Africa. The epidermal strips from the segments of its

fan-shaped leaves could, no doubt, be produced quite as long as those of the Madagascar Rafia.

While suggesting these other sources, it would be well, however, to confine attention at first to the Rafia palms, and especially in view of the fact that they form, as in the colony of Lagos, the prevailing vegetation over immense tracts of country.

The commercial position with regard to Rafia fibre is given below by Messrs. Ide and Christie. It will be noticed that particular attention is drawn to the fact that previous shipments of West African Rafia have failed because the strips were too short, and not presented in the flat broad condition characteristic of the Madagascar fibre. Too much reliance should not be placed on the exceptionally high price of Rafia at the present time. It would be safer to count only on the more normal price of the fibre, and this during the last few years has been about 30*l.* per ton:—

Messrs. IDE and CHRISTIE to ROYAL GARDENS, KEW.

72, Mark Lane, London, E.C.;
DEAR SIR, 4th March 1895.

Yours of the 2nd instant, with sample of West African Rafia, to hand. This we have seen once or twice before, and sold with difficulty, being very inferior to the Madagascar. The former is very short and hairy, not long and broad like the latter, and would appear to be peeled from much smaller leaves.

We return your specimen along with a piece of the usual Madagascar, whilst the latter is available the trade would only look at the West African at about half the price.

Yours faithfully,
(Signed) IDE and CHRISTIE.

The following account of the production of Rafia fibre has been published in the United States' *Consular Reports* for April 1894. It was prepared by Mr. Edw. Telfair Wetter, the United States Consul at Tamatave:—

Rafia Palm Fibre.

This fibre is the product of the Rafia palm (*Raphia Ruffia*), one of the most useful of the palm family. The tree is a native of Madagascar, growing profusely along its entire coast line near fresh water rivers, lagoons, and marshes, and the very best quality actually in the water. It is practically indigenous in the valleys all over the island. The natives cut the new leaves from the tree after they have obtained a height of some seven feet, and have just commenced to spread or open. Two new leaves always sprout out simultaneously from each tree and from the same sheath. In appearance and gracefulness, a fully opened Rafia palm leaf is midway between the leaf of the cocoanut palm and the plume of the ostrich.

After removal from the tree the leaves are separated, the leaf spears or feathers being cut away from the heavy leaf stalk or large centre rib and their tips cut off or not, according to the whim or needs of each worker. The inhabitants of the fishing villages are the main producers of Rafia fibre, because they are the main consumers of the by-products, making their finer fish nets from the small centre rib or spine

that runs down the middle of each leaf spear. The entire native population use the leaf stalk or large centre rib in all their building and portage operations.

The first process of manufacture, in turning these leaf spears into the Rafia of commerce, consists in the removal, with a very small sharp knife, of the centre ribs of the spears. These ribs divide each spear in half. Each of these halves of leaf flesh are then stripped of their under covering, which, in the closed condition of the spear is, for the moment, the outside. This removal is readily accomplished by making a small cut across the leafy flesh above mentioned, about one inch from the base. The fibre, which exists in the shape of a vegetable film or covering on the under side of the leaf spear, is pressed up and loosened with the knife, and, being caught between the thumb and said point, is ripped off at one pull. The same thing is done with the other half of the spear flesh by merely reversing the same in the other hand and repeating the operation. Practice makes the process a simple, perfect, and rapid one, and a woman can readily strip, per day, what will yield some five pounds of Rafia. It must be understood that the men cut the Rafia leaves and carry them to their homes; the women do the rest. They, however, rarely strip more than what would yield two pounds of Rafia, because the curing of the fibre is partly accomplished the afternoon of the same day that it is stripped from the spear flesh.

The strips of whitish fibre thus secured, ranging from 2 to 4 feet and over in length, are spread out upon mats in the sun to dry in loose bunches. When partly dry, they are knotted into one pound bunches and spread, usually upon the roof edges of small sheds or outhouses, to finish curing, and are most carefully guarded against rain or dew. In three days of good sun drying the Rafia is ready for market.

I regret to say that, owing to the cupidity of the natives and traders, much the larger portion is marketed after only one day's curing. The greener the fibre the heavier the weight; hence the temptation. . . . There is no particular time for preparing, cutting, or curing Rafia. The crop is a constant one, harvested to suit the wants or appetites of the natives, being received in the seaport towns at all times and seasons, weather permitting its transport, and shipped as shortly after receipt as possible. . . . It may be roughly stated that fully 50 per cent. of the young Rafia palm trees are annually destroyed in this way, and but for its remarkable hardiness, ready growth, and the ease with which it is propagated, this fact alone would mean its speedy and total extinction. Within four years, local Malagasy laws have been promulgated forbidding this terrible destruction. Yet it still exists, but in a surreptitious manner; or whenever they crave rum, cloth, or vazaha finery, for which Rafia fibre alone can be bartered.

. . . . Rafia is one of the most staple of Madagascan products, finding an even more ready market than rubber or caoutchouc. The price in Tamatave, or we might say free on board, as the cost of putting on board in quantity is a very nominal one, ranging from 5 to 9 cents for A 1 Rafia, while red Rafia usually brings about 2 cents per pound less than the A 1 white. . . . Practically, every one doing business in Madagascar buys Rafia either for speculation, in barter for goods, on commission, or as agents.

CCCCLV.—DIAGNOSES AFRICANÆ, V.

OLEACEÆ.

Auctore J. G. Baker.

180. *Jasminum Smithii*, *Baker*, ramulis gracilibus glabris, foliis oppositis simplicibus ovatis vel oblongis obtusis subcoriaceis breviter petiolatis, floribus 1-3 terminalibus breviter pedicellatis, calycis tubo campanulato glabro, dentibus 6 subulatis tubo paulo longioribus, corollæ tubo cylindrico, lobis 10 lanceolatis tubo duplo brevioribus.

Habitat.—Mount Kilimanjaro, *Lieut. C. S. Smith*.

Folia 12-18 lin. longa. *Calyx* tubus 2 lin. longus. *Corollæ* tubus 12-13 lin. longus.

181. *Jasminum microphyllum*, *Baker*; erectum vel sarmentosum, ramulis dense pubescentibus, foliis oppositis simplicibus ovatis firmulis acutis dorso pubescentibus, floribus 1-3-nis terminalibus, calycis tubo campanulato dentibus lanceolatis tubo æquilongis, corollæ albæ tubo cylindrico, lobis 8-10 lanceolatis tubo duplo brevioribus.

Habitat.—Angola, province of Huilla, alt. 3800-5500 feet, *Welwitsch*, 932.

Folia 9-12 lin. longa. *Calyx* 2 lin. longus. *Corollæ* tubus 9 lin. longus.

182. *Jasminum obtusifolium*, *Baker*; ramulis pubescentibus, foliis simplicibus oppositis oblongis obtusis brevissime petiolatis dorso subtiliter pubescentibus, cymis paucifloris terminalibus pedicellis brevibus, calycis tubo campanulato dentibus lanceolatis tubo æquilongis, corollæ tubo cylindrico, lobis 7-8 lanceolatis tubo duplo brevioribus.

Habitat.—Banks of the Niger at Yomba and Kawgaw, *Barter*.

Folia 12-18 lin. longa. *Calyx* 2 lin. longus. *Corollæ* tubus 12-15 lin. longus.

183. *Jasminum brevipes*, *Baker*; sarmentosum, ramulis gracilibus glabris, foliis oppositis simplicibus oblongis acutis vel obtusis subcoriaceis glabris breviter petiolatis, cymis paucifloris terminalibus, pedicellis brevissimis, calycis tubo campanulato dentibus linearibus tubo paulo brevioribus, corollæ albæ tubo cylindrico, lobis 6 lanceolatis tubo duplo brevioribus.

Habitat.—Angola, province of Golungo Alto, alt. 1000-2400 feet, *Welwitsch*, 926.

Folia 2-3 poll. longa. *Calyx* 2 lin. longus. *Corollæ* tubus pollicaris.

184. *Jasminum brachyscyphum*, *Baker*; ramulis glabris, foliis simplicibus oppositis ovatis vel acuminatis glabris breviter petiolatis, cymis paucifloris terminalibus, pedicellis brevibus glabris, calycis tubo campanulato dentibus subulatis tubo duplo brevioribus, corollæ tubo cylindrico, lobis 5-6 oblongo-lanceolatis tubo brevioribus.

Habitat.—Shiré Highlands, Zambesi-land, *Buchanan*.

Folia 1-2 poll. longa. *Calyx* 3 lin. longus. *Corollæ* tubus 9 lin. longus; lobi 6 lin. longi.

185. *Jasminum Kirkii*, *Baker*; ramulis gracilibus dense pubescentibus, foliis oppositis simplicibus oblongis brevissime petiolatis dorso subtiliter pubescentibus, cymis terminalibus 1-2-floris, pedicellis brevissimis, calycis tubo campanulato dentibus lanceolatis tubo æquilongis, corollæ tubo cylindrico, lobis 6-7 lanceolatis tubo brevioribus.

Habitat.—Zambesi-land at Shamba and between Lupata and Tette, *Sir John Kirk*.

Folia 1-1½ poll. longa. *Calyx* 2 lin. longus. *Corollæ* tubus 9 lin. longus; lobi semipollicares.

186. *Jasminum stenodon*, *Baker*; ramulis gracilibus glabris, foliis oppositis simplicibus ovatis obtusis glabris breviter petiolatis basi late rotundatis, cymis terminalibus 3-4-floris, floribus distincte pedicellatis, calycis tubo campanulato dentibus subulatis tubo æquilongis, corollæ albæ tubo cylindrico, lobis 9-10 lanceolatis tubo paulo brevioribus.

Habitat.—Angola, *Monteiro*.

Folia 1½-2 poll. longa. *Calyx* 3 lin. longus. *Corollæ* tubus pollicaris.

187. *Jasminum obovatum*, *Baker*; late sarmentosum ramulis dense pubescentibus, foliis oppositis simplicibus superioribus obovatis cuspidatis inferioribus ovatis brevissime petiolatis, cymis paucifloris terminalibus et axillaribus, pedicellis productis, calycis dense pubescentis dentibus tubo æquilongis, corollæ tubo elongato gracili, lobis 6-7 linearibus tubo brevioribus.

Habitat.—Angola, province of Pungo Andongo, alt. 2400-3800 feet, *Welwitsch*, 928.

Folia 2-3 poll. longa. *Calyx* 2 lin. longus. *Corollæ* tubus pollicaris et ultra; lobi 9 lin. longi.

188. *Jasminum Welwitschii*, *Baker*; late sarmentosum, ramulis pubescentibus, foliis oppositis simplicibus ovatis vel oblongis dorso pubescentibus superioribus acutis basi rotundatis inferioribus obtusis subcordatis brevissime petiolatis, cymis paucifloris terminalibus, pedicellis brevibus, calycis tubo campanulato dentibus lanceolatis tubo multo brevioribus, corollæ albæ tubo cylindrico, lobis 5-6 tubo distincte brevioribus.

Habitat.—Angola, province of Pungo Andongo, alt. 2400-3800 feet, *Welwitsch*, 927.

Folia 1-2 poll. longa. *Calyx* 2 lin. longus. *Corollæ* tubus 8-9 lin. longus.

189. *Jasminum longipes*, *Baker*; late sarmentosum, ramulis gracillimis pubescentibus, foliis simplicibus oppositis vel inferioribus alternis oblongis acutis firmulis dorso leviter pubescentibus, petiolo brevi piloso, cymis paucifloris terminalibus vel axillaribus, pedicellis gracillimis elongatis, calycis tubo subcylindrico, dentibus linearibus tubo brevioribus, corollæ tubo cylindrico lobis 9-10 lanceolatis tubo distincte brevioribus.

Habitat.—Angola, province of Golungo Alto, alt. 1000-2400 feet, *Welwitsch*, 925.

Folia $1\frac{1}{2}$ –3 poll. longa. *Calyx* 4 lin. longus. *Corollæ* tubus 9 lin. longus; lobi 6 lin. longi.

190. *Jasminum angolense*, *Welw. herb.*; *Baker*; erectum, fruticosum, ramulis glabris, foliis oppositis simplicibus firmis parvis orbicularibus vel ovatis obtusis breviter petiolatis, cymis terminalibus 4–8-floris, pedicellis brevibus, calycis tubo campanulato dentibus subulatis tubo longioribus, corollæ extus purpureæ intus albidæ tubo cylindrico, lobis 9–10 lanceolatis tubo æquilongis.

Habitat.—Angola, province of Loanda, *Welwitsch*, 924.

Folia 9–12 lin. longa. *Calyx* 3–4 lin. longus. *Corollæ* tubus pollicaris.

191. *Jasminum oleæcarpum*, *Baker*; ramulis glabris, foliis oppositis simplicibus ovatis acutis membranaceis glabris breviter petiolatis, cymis paucifloris terminalibus, pedicellis brevibus, calycis tubo campanulato dentibus subulatis tubo longioribus, corollæ tubo cylindrico, lobis 8–9 lanceolatis tubo æquilongis.

Habitat.—Banks of the Rovuma river and on the Zambesi at Senna and Tette, *Sir John Kirk*.

Folia 12–18 lin. longa. *Calyx* 3 lin. longus. *Corollæ* tubus 9 lin. longus.

192. *Jasminum Walleri*, *Baker*; ramulis gracilibus subtiliter pubescentibus, foliis oppositis simplicibus oblongis acutis membranaceis brevissime petiolatis dorso pubescentibus, cymis paucifloris terminalibus et axillaribus, pedicellis brevibus, calycis tubo campanulato, dentibus subulatis tubo duplo longioribus, corollæ tubo cylindrico, lobis 7–8 linearibus tubo æquilongis.

Habitat.—Manganja hills, *Rev. H. Waller*. On the Zambesi at Tette and Magomero Mission Station, *Sir John Kirk*.

Folia 1–3 poll. longa. *Calyx* 3 lin. longus. *Corollæ* tubus 9 lin. longus.

193. *Jasminum ternifolium*, *Baker*; ramulis leviter pubescentibus, foliis ternis simplicibus oblongis vel ovatis acutis glabris subcoriaceis distincte petiolatis, cymis densifloris compositis terminalibus, pedicellis brevissimis pubescentibus, calycis parvi dentibus ovatis tubo brevioribus.

Habitat.—Bongo land, *Dr. Schweinfurth*.

Folia $1\frac{1}{2}$ –2 poll. longa, petiolo 4–6 lin. longo. *Calyx* $1\frac{1}{2}$ lin. longus. *Corolla* ignota.

194. *Schrebera Buchanani*, *Baker*; arbor erecta, ramulis gracilibus pubescentibus, foliis oppositis simplicibus oblongis obtusis subcoriaceis facie glabris dorso præsertim ad costam pubescentibus, floribus ignotis, fructu pyriformi, valvis lignosis, seminibus ovoideis ala lata chartacea.

Habitat.—Shiré Highlands, *Buchanan*. Native name *Makan-gunola*.

Folia 1–2 poll. longa. *Capsula* 15–18 lin. longa, 1 poll. diam. *Semina* pollicaria.

LOGANIACEÆ.

Auctore J. G. Baker.

195. *Mostuea Walleri*, *Baker*; fruticosa, ramulis dense pubescentibus, foliis oblongis obtusis vel subacutis brevissime petiolatis basi cuneatis dorso ad venas hispidis, stipulis ovatis acutis parvis, cymis 2-3-floris plerisque terminalibus, pedicellis hispidis, calycis hispidi dentibus lanceolatis tubo longioribus, corollæ albæ tubo late infundibulari, lobis ovatis tubo æquilongis.

Habitat.—Zambesi-land, on the top of Moramballa, alt. 3000 feet, *Rev. H. Waller*.

Folia 9-12 lin. longa. *Calyx* 2 lin. longus. *Corolla* 4 lin. longa. *Fructus* ignotus.

196. *Mostuea fuchsifolia*, *Baker*; fruticosa, ramulis pubescentibus, foliis oblongis obtusis membranaceis brevissime petiolatis basi cuneatis dorso tenuiter pubescentibus, stipulis deltoideis, cymis axillaribus paucifloris, bracteis minutis, pedicellis calyce longioribus, calycis tubo brevissimo, dentibus acutis tubo longioribus, corollæ albæ lobis ovatis tubo duplo brevioribus, capsulæ lobis orbicularibus divaricatis.

Habitat.—Angola, *Welwitsch*, 4759. Ambriz and Quiballa, *Monteiro*.

Folia 1-2 poll. longa. *Calyx* 1 lin. longus. *Corolla* 6 lin. longa.

197. *Mostuea orientalis*, *Baker*; fruticosa, ramulis brunneis, foliis ovato-oblongis vel oblongis obtusis minute mucronatis membranaceis glabris brevissime petiolatis, stipulis ovatis obtusis, cymis multis axillaribus paucifloris, bracteis minutis, calycis tubo brevissimo dentibus ovatis acutis tubo longioribus, corollæ tubo late infundibulari, dentibus ovatis tubo æquilongis.

Habitat.—Mombasa, East Africa, *Rev T. Wakefield*.

Folia 1-2½ poll. longa. *Calyx* 1 lin. longus. *Corolla* 4 lin. longa. *Capsula* ignota.

198. *Strychnos zizyphoides*, *Baker*; sarmentosa, cirrhosa, ramulis glabris, cirrhis simplicibus gracilibus, foliis obovatis subacutis coriaceis glabris supra basin triplinerviis, cymis multifloris compositis axillaribus, pedicellis brevibus, calycis minuti lobis latis obtusis, flore ante anthesin globoso, stylo brevissimo, fructu parvo globoso monospermo.

Habitat.—Gold Coast, *Sir R. Burton* and *Capt. Cameron*.

Folia 1-1½ poll. lata. *Fructus* 4 lin. diam.

199. *Strychnos subscandens*, *Baker*; sarmentosa, cirrhosa, ramulis glabris, foliis oblongis acutis glabris brevissime petiolatis basi rotundatis obscure triplinerviis, cymis axillaribus brevissime pedunculatis, calycis minuti lobis latis obtusis, fructu parvo globoso monospermo.

Habitat.—Angola, province of Loanda, *Welwitsch*, 6018.

Folia 2-3 poll. longa. *Fructus* 4 lin. diam.

200. *Strychnos Vogelii*, *Baker*; sarmentosa, cirrhosa, ramulis glabris, foliis oblongis acutis vel subacutis subcoriaceis glabris e basi ad

medium triplinerviis, cymis axillaribus brevissime pedunculatis, calycis minuti lobis suborbicularibus, fructu magno pomiformi glauco.

Habitat.—Attah on the Quorra, *Vogel*.

Folia 3–4 poll. longa.

201. *Strychnos lucens*, *Baker*; sarmentosa, cirrhosa, ramulis glabris, cirrhis furcatis, foliis oblongis ad apicem obtusum attenuatis brevissime petiolatis obscure triplinerviis coriaceis utrinque nitidis glabris, cymis axillaribus paucifloris breviter pedunculatis, calycis minuti lobis latis obtusis, fructu parvo globoso monospermo.

Habitat.—Angola, *Welwitsch*, 6015.

Folia $1\frac{1}{2}$ –2 poll. *Corolla* ignota.

202. *Strychnos nigritana*, *Baker*; sarmentosa, cirrhosa, ramulis gracilibus glabris, foliis oblongis acutis coriaceis nitidis glabris breviter petiolatis e basi ad medium triplinerviis, cymis paucifloris axillaribus breviter pedunculatis, pedicellis brevibus glabris, calycis tubo brevi lobis ovatis obtusis valde imbricatis, corollæ tubo fauce piloso lobis ovatis tubo brevioribus, stylo elongato, fructu ignoto.

Habitat.—Nupe, Eppah and Lagos Island, *Barter*.

Folia 3–4 poll. longa. *Calyx* 2 lin. longus. *Corollæ* tubus 4 lin. longus.

203. *Strychnos loandensis*, *Baker*; sarmentosa, cirrhosa, ramulis glabris, foliis oblongis acutis glabris brevissime petiolatis obscure triplinerviis, cymis paucifloris axillaribus sessilibus, pedicellis brevibus, calycis lobis ovatis obtusis, corollæ tubo brevissimo, lobis ovatis obtusis, fructu ignoto.

Habitat.—Angola, province of Loanda, *Welwitsch*, 6016.

Folia 10–12 lin. longa. *Calyx* 1 lin. longus.

204. *Strychnos Moloneyi*, *Baker*; erecta, ecirrhosa, ramulis glabris, foliis oblongis acutis rigide coriaceis glabris breviter petiolatis e basi triplinerviis, cymis pluribus axillaribus breviter pedunculatis, calycis lobis brevibus ovatis obtusis, fructu parvo globoso monospermo.

Habitat.—Onitsha, *Barter*. Accra, *Sir A. Moloney*. Sierra Leone, *Scott Elliot*, 5431.

Folia 3–4 poll. longa. *Fructus* 4–6 lin. diam.

205. *Strychnos sennensis*, *Baker*; fruticosa, erecta, ecirrhosa, ramulis tetragonis glabris, foliis oblongis acutis subcoriaceis glabris subsessilibus e basi triplinerviis, cymis multifloris axillaribus breviter pedunculatis, calycis minuti lobis ovatis obtusis, fructu ignoto.

Habitat.—Valley of the Zambesi, opposite Senna, *Sir John Kirk*.

Folia 2–3 poll. longa.

206. *Strychnos microcarpa*, *Baker*; fruticosa, erecta, ecirrhosa, ramulis glabris, foliis oblongis acutis subcoriaceis glabris brevissime petiolatis obscure triplinerviis, cymis paucifloris axillaribus breviter pedunculatis, calycis tubo brevi lobis latis ovatis obtusis, fructu parvo globoso monospermo.

Habitat.—Angola, province of Loanda, *Welwitsch*, 4765.

Folia $1\frac{1}{2}$ poll. longa. *Corolla* ignota. *Fructus* 4–6 lin. diam.

207. *Strychnos chrysocarpa*, *Baker*; fruticosa, erecta, ecirrhusa, ramulis glabris, foliis oblongis acutis rigide coriaceis glabris brevissime petiolatis e basi triplinerviis, cymis axillaribus et terminalibus brevissime pedunculatis, calycis tubo brevissimo, lobis latis obtusis, fructu magno aurantiaco polyspermo.

Habitat.—Gold Coast, *Sir R. Burton* and *Captain Cameron*. Sierra Leone, *Dr. Halcro Johnston*.

Folia 2–3 poll. longa. *Fructus* $1\frac{1}{2}$ –2 poll. diam.

208. *Strychnos Wakefieldi*, *Baker*; fruticosa, erecta, ecirrhusa, ramulis glabris, foliis obovatis obtusis rigide coriaceis glabris basi euneatis supra basin triplinerviis brevissime petiolatis, cymis paucifloris lateralibus, pedunculis pedicellisque brevissimis, calycis tubo brevissimo lobis suborbicularibus, stylo brevi, fructu ignoto.

Habitat.—Mombasa, *Rev. T. Wakefield*.

Folia 1– $1\frac{1}{2}$ poll. longa. *Calyx* $\frac{3}{4}$ lin. longus. *Corolla* ignota.

209. *Strychnos triclisioides*, *Baker*; erecta, ecirrhusa, ramulis pallidis pubescentibus, foliis brevissime petiolatis obovato-oblongis obtusis rigide coriaceis e basi triplinerviis dorso pubescentibus, cymis axillaribus paucifloris breviter pedunculatis, calyce campanulato lobis orbicularibus, corollae tubo cylindrico lobis ovatis, stylo elongato, fructu globoso polyspermo magnitudine mediocri.

Habitat.—Banks of the Niger at Nupe, *Barter*. Niger confluence at Lukugu, *J. T. Dalton*.

Folia 2–3 poll. longa. *Calyx* $\frac{3}{4}$ lin. longus. *Corolla* 3 lin. longa.

210. *Strychnos Burtoni*, *Baker*; erecta, ecirrhusa, ramulis pubescentibus, foliis obovatis obtusis brevissime petiolatis glabris triplinerviis, cymis multifloris axillaribus sessilibus vel subsessilibus, calycis tubo brevissimo lobis suborbicularibus, fructu globoso magno polyspermo pulpo eduli, seminibus magnis orbicularibus compressis.

Habitat.—Zanzuebar, *Sir R. Burton*, *Sir John Kirk*. Shiré Valley and at Shupanga and Kongone, *Sir J. Kirk*. Native names *Inthemo* and *Intemo*.

Folia 3–4 poll. longa. *Calyx* $\frac{3}{4}$ lin. longus. *Fructus* $2\frac{1}{2}$ –3 poll. diam.

211. *Strychnos cocculoides*, *Baker*; arbor parva erecta ecirrhusa, ramulis pubescentibus, foliis suborbicularibus vel oblongis obtusis brevissime petiolatis dorso pilosis, cymis lateralibus, calycis pubescentis lobis ovatis acutis, fructu parvo globoso.

Habitat.—Angola, province of Huilla, *Welwitsch*, 4779. Native name *Maboce dolce*.

Folia 2–3 poll. longa. *Fructus* 3 lin. diam.

212. *Strychnos xerophila*, *Baker*; erecta, ecirrhusa, ramulis pallidis pubescentibus, foliis ovatis vel oblongis obtusis vel emarginatis coriaceis

5-nerviis dorso pubescentibus, cymis axillaribus paucifloris sessilibus pedicellis brevissimis, calycis lobis orbicularibus, corollæ tubo cylindrico, lobis oblongis tubo duplo brevioribus, fructu magno globoso polyspermo pulpa edula.

Habitat.—Madi, *Col. J. A. Grant*. Djur-land, *Schweinfurth*, 1719.

Folia 3-4 poll. longa. *Calyx* 1½ lin. longus. *Corolla* 4 lin. longa. *Fructus* 3-4 poll. diam.

213. *Anthocleista parviflora*, *Baker*; arborea, ramulis crassis lignosis spinosis, foliis obovato-oblongis brevissime petiolatis basi dilatatis, cymis multifloris valde compositis, calycis lobis exterioribus orbicularibus, corolla calyce 3-4-plo longiore lobis circiter 12.

Habitat.—Banks of the Bagroo river, *Mann*.

Folia superiora pedalia, 4-5 poll. lata. *Cymæ* pedales. *Calyx* 3 lin. longus. *Antheræ* 2 lin. longæ.

214. *Anthocleista Kalbreyeri*, *Baker*; arborea, inermis, foliis obovato-oblongis brevissime petiolatis, cymis compositis foliis multo brevioribus, calycis lobis orbicularibus, corollæ tubo calyce vix longiore lobis 16 oblongis tubo longioribus, filamentorum tubo brevissimo antheris, linearibus.

Habitat.—Banks of the Bagroo river, *Kalbreyer*.

Folia ramorum bipedalia, 5-6 poll. lata. *Calyx* 3 lin. longus. *Corollæ* lobi semipollicares. *Antheræ* 3 lin. longæ.

215. *Anthocleista zambesiaca*, *Baker*; arborea, ramulis inermibus, foliis obovato-oblongis brevissime petiolatis, cymis compositis foliis brevioribus, calycis lobis exterioribus orbicularibus, corollæ tubo calyce multo longiore, lobis circiter 12 lineari oblongis tubo brevioribus, filamentorum tubo brevissimo antheris oblongis.

Habitat.—Shiré Highlands, *Buchanan*.

Folia superiora 6-9 poll. longa, 3-4 poll. lata, inferiora sesquipedalia. *Calyx* 3 lin. longus. *Corollæ* tubus 15 lin. longus, lobi 9 lin. longi.

216. *Anthocleista laxiflora*, *Baker*; fruticosa, sarmentosa, ramulis teretibus inermibus, foliis oblongis acutis brevissime petiolatis basi cuneatis, cymis brevibus ramis inferioribus foliis reductis bracteatis, calycis lobis exterioribus ovatis, fructu globoso.

Habitat.—Banks of the Kingui river, 1° N. lat. *Mann*.

Folia 5-6 poll. longa, 2 poll. lata. *Calyx* 9 lin. longus. *Corolla* ignota. *Fructus* 9 lin. diam.

CCCCLVI.—EXPERIMENTAL CULTIVATION AT PORT DARWIN.

The northern territory of South Australia, as is well known, is within the Tropics, and the climate is essentially tropical. It extends from 19° to 23° S. lat., and the more inland parts include portions of the

extremely arid deserts of Central Australia. The latitude corresponds with that of Madagascar and the southern parts of Brazil, but the seasons are greatly influenced by the neighbourhood of the interior deserts. The rainfall, as may be expected, is very variable. During the year 1893 the rainfall at Port Darwin, representing the coast region, was 62·5 inches, at Burrundie 49·4 inches, while at Powell's Creek, in the interior at about 22° S. lat., it was only 12·6 inches. In the interior the chief industries are pastoral and mining, but along the coast agricultural industries are being steadily pursued. The following report by the Curator of the Botanic Garden and Experimental Nursery at Port Darwin has recently been published. It affords evidence, as pointed out by the president, that "the soil and climate of the Northern Territory are well suited for the cultivation of valuable tropical and sub-tropical products":—

"SIR,

"Palmerston, March 1st, 1894.

"I HAVE the honour to respectfully hand you my report on the progress of the more important experimental plots in the Botanical Garden and Experimental Nursery during the past year.

"*Rice*.—Last season the different varieties made excellent growth, but were eventually nearly completely destroyed by horses breaking into the garden at night. Now, however, that a small sum has been allowed for a new fence the depredations will, I am glad to think, no longer occur. The same block has again been planted this season, and looks extremely well.

"*Sugar-cane*.—The different varieties made very satisfactory growth last season, some in particular showing splendid canes. The second 'ratoons' now are looking as well as can be wished.

"*Cocoa-nuts* continue to progress, and the older they get the brighter the outlook. Several trees in the avenue are now either fruiting or showing a flower spike, and the fruit that has already matured on the trees first planted in the garden has been exceptionally large and heavy. The young trees planted out in the reclaimed mangrove swamp last year suffered severely from the attacks of the hermit crabs, and had to be protected by small sheets of tin round their base. They are now gradually recovering.

"*African Oil-palms*.—These continue the satisfactory progress previously reported. Over 300 seeds were obtained from the two older trees during the year, and several hundred more are again available.

"*Betel-nut palms* have made very good growth, and I expect them shortly to fruit.

"*Ginger*.—Splendid tubers were produced last season, and I have increased the area of the block under cultivation. The plants now are just showing above the ground. Two varieties are cultivated.

"*Starch-producing plants*.—Arrowroot and Cassava.—So satisfactory has been the growth of both these starch-producing plants last season that I have increased the area of the block under cultivation. The plants are now looking splendid. *Tous le mois* occupies a small block and has always done well. This is the plant yielding the starch produced in Queensland, but the product does not realise quite as high a price as that obtained from the real arrowroot, and I note in a recent official publication that endeavours are being made to replace its cultivation by that of arrowroot. *Tacca pinnatifida*—the plant yielding

South Sea Island arrowroot—is indigenous to the territory, and occurs spontaneously in the garden. Plants of it were distributed by the Royal Gardens, Kew, during the year to different Crown colonies as a plant desirable for introduction.

“*Oil plants.*—Sesamum, two varieties, as usual made satisfactory growth last season and is again doing as well. Peanuts.—An increased area has been planted this season, and I have never noticed finer growth. Two varieties are cultivated. Among other oil plants represented in the garden may be mentioned jatropha, behn, castor, chufa, croton.

“*Fibre plants.*—Sisal hemp.—Our plants have made satisfactory growth and already produce suckers. Owing to the representations of intending planters the Government undertook during the past year to import a quantity of plants for sale, and these arrived on the 18th of January this year. Six thousand plants had been ordered from Florida, but owing, I consider, to having been packed while in a too sappy condition, only 5,300 were alive on arrival, and these in a very weak condition, the white heart leaf and root stock alone remaining. The plants were at once put out in nurseries, and, I am glad to say, made a remarkable recovery, very few indeed being lost. Five thousand plants were sold, but, on account of their weak state on arrival, were allowed to remain in the nurseries until the next wet season. The duration of the plant from observations made in Yucatan is supposed to be 14 years, that is, from planting until the flower spike is produced, when the plant dies; but recent developments in the Bahamas seem to show that there, at least, the plant flowers in seven years and dies, and this is considerably modifying the brilliant estimates made. Pita, or pineapple fibre.—In an official bulletin issued by the Royal Gardens, Kew, it is recorded that a sample of pineapple fibre from the Straits Settlements was recently submitted to a manufacturer, and valued by him at 30*l.* a ton, with the statement that he alone was prepared to take, say, a thousand tons a year. Sunn hemp, a plant largely cultivated in India, is represented by a small block, though, as a matter of fact, it is indigenous to the Territory, and has been noticed by the late curator of the garden occurring with rice on the Daly River. Another Indian fibre, the jute, represented in our collection, is also indigenous to the Territory. The value of the raw fibre of this plant annually imported into England is stated to be over 4,000,000*l.* sterling. Ramie fibre.—A fresh block has been planted with roots of this plant, and magnificent growth has been made. Bowstring hems.—Three species are represented in the garden, but only two (*Sansevieria zeylanica* and *S. cylindrica*) grow large enough for fibre purposes. The plants have been proved well adapted to the climate, and last year a successful experiment was made in propagating them from leaf cuttings, one leaf giving perhaps half a dozen plants, so that a stock can be soon worked up when required. The fibre produced is stated to be excellent, and worth 20*l.* to 30*l.* a ton. Among other kinds growing may be mentioned the following, proved thoroughly suited to the place, viz., Manila hemp, of which a small block has been planted out; 50,000 tons of this fibre are annually exported from the Philippine Islands; Deccan hemp, Abroma, Mauritius hemp.

Citronella grass (yielding essential oil).—The plants put out to cover a large vacant block of ground on the slope on the hill look a picture of luxuriance without having received any attention whatever, and so strong is the growth that not a weed is to be seen below the lines.

"*Cinnamon*.—Young and old continue to make the same satisfactory progress.

"*Vanilla*.—Our plants were cut up for propagation and the resulting young plants put out in a shade-house, where they are making good progress. Two kinds are in our collection.

"*Nutmegs*.—This plant was re-introduced, and I am sorry to say, again lost. I have, however, made arrangements to obtain some more for further trial, as I cannot but think that it should do well in certain situations, and the fact that an indigenous species thrives about Palmerston also encourages me to persevere. I propose planting a quantity of seed of the native species, and to try and graft the introduced plant on the stocks thus obtained.

"*Sorghums and Millets*.—Five varieties of the former and three of the latter are represented in small blocks, and have done very well, the broom corn, used in the manufacture of American brooms, being especially good.

"*India-rubbers*.—Three kinds have been grown for some time and a fourth, *Ficus elastica*, was introduced during the year. *Cryptostegia grandiflora* and *Manihot Glaziovii* (Ceara rubber) freely produced seed in the garden. Of the latter kind a quantity of plants were raised and will be planted out in vacant ground.

"*Grams* are, as usual, represented in small plots, and have again done well.

"*Dhal* looks magnificent, and cannot be too highly recommended for cultivation as a stable pulse.

"The condition of the garden has been well maintained during the year, and, as opportunity offers, shrubs and trees are planted out.

"I have, &c.

"NICHOLAS HOLTZE, Curator.

His Honour Mr. Justice Dashwood,

"Government Resident."

CCCCLVII.—DECADES KEWENSES.

PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATARUM.

DECADES XV.—XIX.

141. *Vavæa megaphylla*, *Wright* [Meliaceæ]; arbor procera, foliis obovato-lanceolatis petiolatis glabris penninerviis nerviis secundariis subtus prominentibus, floribus paniculam prope apices ramorum formantibus, bracteis oblongis, calyce cupulari irregulariter 5-7-lobato, petalis 5-7 oblongis contortis carinatis albis utrinque hirsutis, staminibus 12-16, filamentis latis connatis antice prope apices villosis, antheris liberis oblongis, ovario globoso apice hirsuto triloculari, stylo brevi, stigmatibus trilobato, ovulis in loculo quoque 2 collateralibus.

Habitat.—Fiji; Tamavua, D. Yeoward, 37.

Folii petiolus 2½ poll. longus, *lamina* 12 poll. longa, 6 poll. lata. *Calyx* 2 lin. longus. *Corolla* 4 lin. longa.

142. *Cymbosepalum*, *Baker* [Leguminosarum-Cæsalpiniearum genus novum.] *Calyx* tubo brevissimo, lobis 5 inæqualibus oblongis, infimo maximo ante anthesin cymbæformi demum explanato. *Petala* 5, oblanceolata, obtusa, æqualia. *Stamina* 10, petalis, æquilonga, filamentis liberis filiformibus, antheris oblongis versatilibus. *Ovarium* lineare, breviter stipitatum, ovulis 2-3; stylus gracilis, curvatus, apice incrassatus, stigmatè terminali. *Fructus* ignotus.

C. Baroni, *Baker*: arbor partibus omnibus glabris, foliis simpliciter æqualiterque pinnatis, foliolis 3-4-jugis sessilibus obovatis coriaceis basi articulatis, racemo denso, pedicellis strictis sæpe 2-4-nis, bracteis parvis deltoideis cuspidatis deciduis, calycis segmentis deciduis.

Habitat.—North Madagascar, *Rev. R. Baron*, 6422.

Folia $1\frac{1}{2}$ -2 poll. longa; *foliola* 5-6 lin. longa. *Racemus* 2-3 poll. longus; *pedicelli* 2 lin. longi. *Calycis* segmentum infimum $1\frac{1}{2}$ lin. longum. *Petala* 2 lin. longa.

Allied to *Cynometra*, of which there are several species in Madagascar, but differing from it by its peculiar calyx, ovules 2-3 and typically racemose inflorescence.

143. *Weinmannia stenostachya*, *Baker* [Saxifrageæ]; glabra, foliis imparipinnatis, foliolis 5-7 oblongo-lanceolatis acutis coriaceis nitidis subintegris lateralibus basi obliquis, floribus parvis in spicas densas aggregatis, calycis tubo brevissimo dentibus ovatis obtusis, petalis oblongis calycè sesquilogioribus, staminibus breviter exsertis, ovario oboideo pubescente, stylis brevibus.

Habitat.—Northern Madagascar, *Rev. R. Baron*, 6406.

Folia 6-8 poll. longa; *foliola* 3-4 poll. longa, medio 12-15 lin. lata. *Spica* 3-4 poll. longæ. *Calyx* $\frac{1}{2}$ lin. longus.

Nearly allied to *W. lucens* and *fraxinifolia*, *Baker*. There are many species of this genus in Madagascar, some of which yield valuable timber.

144. *Terminalia triptera*, *Stapf* [Combretaceæ]; arbor mediocris glabra, ramulis gracilibus, cortice fusciscente lenticellis pallidis crebris instructo, foliis alternis vel suboppositis ellipticis vel oblongis basi acutis apice subacuminatis subcoriaceis supra glaucis subtus pallide fulvo-viridibus subtus tenuiter-reticulatis, nervis lateralibus utrinque 6-8 pedunculo gracili, spicis gracillimis in paniculam vel in racemum terminalem dispositis vel solitariis, rhachi minute puberula, bracteis linearibus floribus paulo brevioribus mox deciduis, calycè subasymmetrico tubo ovoideo limbo breviter lateque 4-lobo, lobis subacutis, intus villosis, fructu oblongo 3-alato alis æqualibus.

Habitat.—Island of Langkai, *C. Curtis*, 1684.

Folia $1\frac{1}{2}$ -2 $\frac{1}{2}$ poll. longa, $1-1\frac{3}{4}$ poll. lata; *petiolus* 4-6 lin. longus. *Spica* $\frac{1}{2}$ -1 poll. longæ. *Flores* $\frac{3}{4}$ lin. longi. *Fructus* 9 lin. longus, cum alis 6-8 lin. latus.

This species is nearest allied to the Philippine *Terminalia polyantha*, Presl, from which it differs mainly in the very slender branchlets, the narrower and more acute leaves and rather smaller flowers. The number of the calyx lobes and stamens is the same in both species, viz., 4 and 8 respectively. The fruit wings

number generally 4, rarely 3 in *T. polyantha*, whilst *T. triptera* almost always has 3 wings; only once a fourth wing was found, and this was smaller than the 3 others. It is the dorsal pair of wings which is replaced by a single wing. Corresponding with this reduction, the receptacle has only 3 vascular bundles or nerves, one in front and one on each side, to the right and to the left, these three nerves running right to the tips of the corresponding sepals, whilst the fourth and dorsal sepal receives its nerve as a branch from one of the lateral bundles. This ramification takes place at the base of the cup-shaped calyx. The suppression of the dorsal vascular bundle of the receptacle and the corresponding replacement of the 2 dorsal wings by one, whilst the calyx retains its tetramerous structure, is very remarkable, and it would be interesting to know whether the trimerous structure of the receptacle is indeed the normal one, as it appears to be from the material seen.

145. *Fœtidia clusioides*, Baker [Myrtaceæ]; foliis coriaceis sessilibus oblanceolato-oblongis obtusis vel subacutis vena intramarginali perspicua undulata præditis, floribus solitariis axillaribus, calycis lobis oblanceolato-oblongis subpetaloideis distincte costatis, staminibus stylo duplo brevioribus.

Habitat.—North Madagascar, *Rev. R. Baron*, 6250.

Folia 4–6 poll. longa, medio $1\frac{1}{2}$ –2 poll. lata, e medio ad basin sensim attenuata. *Calycis* lobi 8–9 lin. longi. *Stylus* 5–6 lin. longus, apice 4-cuspidatus. *Discus* floriferus 2 lin. diam.

Of this very anomalous and curious genus of Myrtaceæ three species are already known—two in Madagascar and a third in Mauritius and Bourbon. The leaves of the present plant resemble in shape those of *P. mauritiana*, but the veining is quite different; the divisions of the flower-wrapper are smaller and less coriaceous, and the stamens are much shorter.

146. *Tibouchina* (*Pseudopterolepis*) *meiodon*, Stapf [Melastomaceæ]; caule rubello acute angulato, angulis viridibus, patule glanduloso-hirsuto, foliis ovato-lanceolatis acutis quinquenerviis, nervis lateralibus basi plus minusve coalitis rugulosis supra æqualiter subtus in nervis venisque tantum setulosis, cymis longiuscule pedunculatis 3–7-floris, bracteis lineari-oblongis parvis apicem versus minute crenulatis et setulosis, pedicellis brevibus vel brevissimis, calycis tubo ovato-oblongo indumento eo caulis consimili vestito, lobis sublinearibus obtusiusculis tubo paulo brevioribus, petalis purpureis obovatis, antheris aureis in rostrum rubellum longiusculum attenuatis connectivo basi breviter producto curvato ultra insertionem bilobo, ovario præter setulas apicales glaberrimo, capsulæ valvis minutis.

Habitat.—Brazil. Cultivated at Kew from seeds believed to have been sent by Dr. Glaziou.

Planta culta ad 6 ped. alta. *Folia* $1-1\frac{1}{2}$ poll. lin. longa, 9–10 lin. lata; petiolus 4–6 lin. longus. *Calycis* tubus $2\frac{1}{2}$ lin. longus. *Petala* 3 lin. longa. *Capsula* vix $1\frac{1}{2}$ lin. longa.

T. meiodon is nearest allied to *T. versicolor*, Cogn., and to *T. cisplatensis*, Cogn.; but it differs from them mainly in the stem, the long peduncled cymes, the long calyx lobes, and the long beak of the anthers.

147. *Memecylon strychnoides*, *Baker* [Melastomaceæ]; arborea, glabra, ramulis virgatis pallide griseis, foliis subsessilibus late oblongis obtusis vel cuspidatis basi rotundatis coriaceis e basi triplinerviis, cymis densis multifloris in paniculas pedunculatas axillares dispositis, pedicellis brevibus, bracteis ovatis parvis, calyce campanulato subtruncato, petalis late ovatis deciduis, staminibus petalis subæquilongis, stylo elongato.

Habitat.—Ikoyi, Lagos, west tropical Africa, *Millen*.

Folia 3–4 poll. longa, medio 2–3 poll. lata. *Calyx* 1 lin. diam. *Petala* $1\frac{1}{2}$ lin. longa.

A small tree, with umbels of very small bluish flowers. Leaves very like those of a *Strychnos*. Fruit not seen. Its nearest ally is *M. Barteri*, *Hook. fil.*

148. *Argostemma concinnum*, *Hemsl.* [Rubiaceæ-Hedyotideæ]; herba caule simplici pusilla, erecta, gracillima, annua, tetraphylla, uniflora, foliis sessilibus membranaceis tenuissimis inæqualibus lineari-lanceolatis vix acutis utrinque attenuatis integris præcipue secus costam parce hispidulis, pedunculo unifloro terminali filiformi foliis brevioribus vel interdum paulo longiore, calycis dentibus minutis deltoideis vix acutis, corollæ fere rotatæ lobis anguste lineari-lanceolatis vix acutis apiculatis patentissimis, filamentis brevissimis, antheris in columnam quam corolla brevioribus conniventibus, connectivis in appendicem longam terminalem scarioso-membranaceam productis, stigmate antheras vix superante.

Habitat.—Northern Siam; growing on moss-covered rock at Pu Kaw, near Mount Mock, at about 6000 feet, *F. H. Smiles*.

Planta $1\frac{1}{2}$ –2 poll. alta. *Folia* 4–14 lin. longa. *Flores* maximi circiter 1 poll. diametro.

This delicate little plant must be a charming object in a living state. Mr. Smiles describes the relatively large flowers as white with a green centre. In the dried state the green part appears as a disc at the base of each lobe of the corolla. It is nearest *A. pumilum*, *Benn.*, a species recorded from the mountains of tropical Africa and eastern India.

149. *Mussænda pilosa*, *Baker* [Rubiaceæ]; ramulis dense pilosis, foliis breviter petiolatis oblanceolato-oblongis acutis basi cuneatis utrinque dense pilosis, floribus in corymbis terminalibus multifloris dispositis, pedicellis dense pubescentibus, bracteis linearibus pilosis, calycis lobis magnis subulatis pilosis, corollæ tubo elongato cylindrico dense piloso, lobis oblongo-lanceolatis acuminatis tubo 2–3-plo brevioribus, genitalibus in tubo inclusis, fructu magno subgloboso piloso.

Habitat.—North Madagascar, *Rev. R. Baron*, 6179.

Folia 4–6 poll. longa, supra medium $1\frac{1}{2}$ –2 poll. lata. *Calycis* lobi demum pollicares. *Corollæ* tubus 21–24 lin. longus. *Fructus* magnitudine nucis avellanæ.

There are several large-flowered species of this genus in Madagascar, of which this is one of the finest.

150. *Eupatorium (Heterolepis) clibadioides*, *Baker* [Compositæ]; fruticosum, glabrum, foliis oppositis subsessilibus ovatis acutis serratis utrinque viridibus, capitulis paucis multifloris corymbosis, involuero

campanulato, bracteis pauciseriatis adpressis glabris dorso conspicue 5-nervatis exterioribus parvis ovatis centralibus oblongis interioribus lineari-oblongis pallidis, acheniis glabris 4-angulatis, pappi setis firmulis ciliatis subæquilongis, corolla rubro-purpurea, stylis longe exsertis.

Habitat.—South Brazil, near Rio Janeiro, *Glaziou*, 18,339.

Folia 3-4 poll. longa. *Involucrum* 3-4 lin. diam. *Pappus* 2 lin. longus.

Nearly allied to *E. Vitalbæ*, D.C., and *E. itacolumiense*, Schultz Bip.

151. *Mikania Carteri*, *Baker* [Compositæ]; late sarmentosa, caulibus gracilibus glabris, foliis distincte petiolatis cordato-ovatis membranaceis viridibus profunde irregulariter palmatim dissectis, capitulis paucis parvis corymbosis, involuero oblongo, bracteis viridibus glabris lineari-oblongis, achenio glabro castaneo, pappo rubro tincto achenio brevior.

Habitat.—Interior of Western Lagos, *Dr. Rowland* (Sir G. Carter's expedition).

Folia majora 12-15 lin. longa et lata. *Involucrum* 2 lin. longum. *Achenium* 1 lin. longum.

The only tropical African species already known is the cosmopolitan *M. scandens*, Willd.

152. *Aspilia Glaziovii*, *Baker* [Compositæ]; perennis, herbacea, caule simplici monocephalo decumbente dense piloso, foliis sessilibus oblongis dentatis basi rotundatis utrinque viridibus hispidis, involuero campanulato, bracteis oblongis obtusis æquilongis foliaceis hispidis, receptaculi paleis linearibus rigidis integris complicatis disci floribus æquilongis, ligulis luteis involuero duplo brevioribus, achenio glabro compresso.

Habitat.—South Brazil, near Rio Janeiro, *Glaziou*, 18,318.

Caulis pedalis. *Folia* caulina 12-18 lin. longa. *Involucrum* 6 lin. longum, bracteis exterioribus 2 lin. latis.

Belongs to the section *Herbaceæ*, near *A. setosa*, Griseb.: *Baker* in *Fl. Bras.*, vol. vi., part 2, p. 195, tab. 63, fig. 2.

153. *Senecio arctiifolius*, *Baker* [Compositæ]; herbaceus, caule erecto elato, foliis petiolatis cordato-ovatis magnis membranaceis repandis facie demum subcalvatis dorso araneosis, capitulis paucifloris homogamis in paniculam amplam ramis corymbosis dispositis, involuero glabro viridulo, bracteis inferioribus circiter 12 lanceolatis æqualibus exterioribus paucis parvis, floribus omnibus discoideis involuero æquilongis, pappo albo flexili.

Habitat.—South Brazil, near Rio Janeiro, *Glaziou*, 18,340.

Caulis, 5-6 pedalis. *Folia* inferiora caulina pedalia. *Involucrum* 3-3½ lin. longum.

Nearly allied to *S. grandis*, Gardn.: *Baker* in *Fl. Bras.*, vol. vi., part 2, p. 304, tab. 83.

154. *Rhododendron Hancockii*, *Hemsl.* [Ericaceæ]; undique glabrum, ramulis floriferis graciliusculis, foliis breviter petiolatis ad apices ramulorum congestis coriaceis persistentibus oblanceolatis vel oblongis breviter acuteque acuminatis, interdum obscure ciliolatis, costa subtus elevata, venis primariis lateralibus numerosis subtus sat conspicuis marginem versus reticulato-conjunctis, gemmis floriferis 1-3 in axillis foliorum superiorum 1-2-floris, squamis per anthesin laxis cito deciduis scarioso-coriaceis ovatis vel superioribus oblongo-lanceolatis acutis ciliolatis apice tantum pilosulis, sepalis parvis inæqualibus deltoideis oblongisve, corolla infundibulari-campanulata glabra, tubo brevissimo, lobis latis obovato-rotundatis, staminibus 10 corolla brevioribus filamentis infra medium hirtellis, ovario 5-6-loculare tomentello, stylo glabro stamina superante, stigmate magno capitato.

Habitat.—China: Mongtse, province of Yunnan, in a mountain glen at 6300 feet, *Hancock*, 156.

Folia 4-8 poll. longa; petiolus 3-4 lin. longus. *Squamæ* majores 1-1½ poll. longæ. *Pedicelli* circiter pollicares. *Corolla* 3½-4 poll. diametro.

This very fine species has white flowers with a pale yellow blotch towards the base of each lobe of the corolla. It belongs to a small group having the flowers springing from the axils of the uppermost leaves, instead of a strictly terminal inflorescence.

155. *Lysimachia grandifolia*, *Hemsl.* [Primulaceæ]; herba parcissime minuteque strigillosa, ramis vel caulibus floriferis crassis, foliis alternis amplis longissime petiolatis membranaceis vel tenuiter papyraceis latis ovoideo-ellipticis breviter apiculato-acuminatis basi rotundatis vel subcuneatis leviter undulatis dense ciliolatis, floribus flavis mediocribus umbellatis, umbellis pedunculatis, bracteatis circiter 6-8-floris ex axillis foliorum superiorum ortis, pedicellis gracilibus bracteis lanceolatis ciliolatis subtentis, calycis segmentis lanceolatis sursum valde attenuatis acutissimis longitudinaliter 5-nervosis margine hispiduloso, corolla alte lobata sed, ut videtur, vix rotata, lobis latis apice rotundatis longitudinaliter tenuiterque venosis margine minute glanduloso, filamentis brevissimis deorsum dilatatis petalis annulatim adnatis, antheris magnis basi cordatis, ovario glabro, stylo filiformi stamina paullo superante, capsula ignota.

Habitat.—Northern Siam: Pu Sam Sum, *F. H. Smiles*.

Planta bipedalis (Smiles). *Folia* cum petiolo 6-9 poll. longa et usque ad 3¾ poll. lata; petiolus 1½-2½ poll. longus. *Pedunculi* circiter 2 poll. longi. *Bracteæ* 4-5 lineas longæ. *Pedicelli* 9-12 lin. longi. *Calycis* segmenta 4 lin. longa. *Corolla* circiter 6 lin. longa vel si rotata circiter 10 lin. diametro.

This is a very distinct species, differing from all others in its thick stems, large alternate leaves, and umbellate or subumbellate flowers. In habit it is more like a *Solanum* than one's idea of *Lysimachia*, although recent discoveries in China have revealed the existence of a large number, presenting great variety in habit.

156. *Mimusops dispar*, *N. E. Brown* [Sapotaceæ]; ramis cinereis glabris, foliis petiolatis cuneato-oblanceolatis obtusis juvenilibus fulvo-tomentosis adultis utrinque glabris viridibus siccis subtiliter reticulatis, floribus 12-16 ad apices ramorum umbellatim dispositis,

pedicellis calycibusque extus primum fulvo-tomentosis demum adpresse cinereo-pubescentibus, sepalis 6-8 biseriatis ovatis exterioribus acutis interioribus obtusis utrinque tomentoso-pubescentibus, petalis 18-24 triseriatis subæqualibus lineari-lanceolatis acutis glabris luteis, staminibus 6-8 quam petala brevioribus, antheris lanceolatis acutis flexuosis quam filamenta glabra subulata multo longioribus subversatilibus, staminodiis lanceolatis acuminatis canaliculatis glabris sublanato-marginatis, ovario globoso dense hirsuto, stylo elongato glabro.

Habitat.—Natal, near Mooi River in "Thorns," at 3000-4000 ft. November, *Wood*, 4472, 5425; *Gerrard*, 1482.

Foliorum petioli 2-4 lin. longi, laminæ 9 lin.-2 poll. longæ, 3-9 lin. latæ. *Pedicelli* 6-8 lin. longi. *Sepala* 3 lin. longa, $1\frac{1}{2}$ lin. lata. *Petala* $2\frac{1}{2}$ -3 lin. longa, $\frac{1}{2}$ - $\frac{3}{4}$ lin. lata. *Staminum filamenta* $\frac{3}{4}$ -1 lin. longæ, antheræ $1\frac{1}{2}$ -2 lin. longæ.

A small-leaved species differing from *M. obovata*, Sond., by its more numerous and more umbellate flowers, which are also smaller and have shorter and less pointed buds. Mr. Wood states that "the fruit is yellow and well flavoured, much liked by the natives, and would, I think, be improved by cultivation." It is called by the natives "*Amapumbula*," a name that is also applied to other species of *Mimusops*.

157. *Mimusops marginata*, *N. E. Brown* [Sapotacæ]; ramis brunneis vel sordide cinereis plus minusve corrugatis glabris, foliis petiolatis elliptico-lanceolatis vel cuneato-oblanceolatis breviter et obtuse cuspidatis vel obtusis basi acutis juvenilibus fulvo-tomentosis adultis utrinque glabris viridibus, floribus 6-16 ad apices ramorum umbellatim dispositis, pedicellis ferrugineo-tomentosis, sepalis 6-8 biseriatis lanceolatis acuminatis exterioribus ferrugineo-tomentosis marginibus cinereis interioribus utrinque cinereo-tomentosis, petalis 18-24 triseriatis subæqualibus lineari-oblongis vel lanceolatis acutis glabris luteis, staminibus 6-8 quam petala brevioribus antheris lanceolatis, apiculato-acutis quam filamenta lanceolato-subulata tomentosa multo longioribus, staminodiis lanceolatis acuminatis canaliculatis extus lanato-tomentosis intus glabris marginibus lanato-tomentosis, ovario globoso-ovoideo dense hirsuto, stylo elongato glabro, fructu ellipsoideo acuto vel acuminato.

Habitat.—Natal: Inanda, *Wood*, 1661; near Umlaas, under 1000 ft. alt., *Wood*, 5340; without locality, *Gerrard*, 1186. Cape Colony: King William's Town District; Komgha, *Flanagan*, 27.

Foliorum petioli $2\frac{1}{2}$ -8 lin. longi, laminæ 2-5 poll. longæ, 9 lin.- $2\frac{1}{4}$ poll. latæ. *Pedicelli* $1-1\frac{1}{2}$ poll. longi. *Sepala* 4-5 lin. longa, $1\frac{1}{2}$ -2 lin. lata. *Petala* 4 lin. longa, $1-1\frac{1}{2}$ lin. lata. *Staminum filamenta* $1-1\frac{1}{2}$ lin. longa, antheræ $2-2\frac{1}{2}$ lin. longæ. *Staminodia* $2-2\frac{1}{2}$ lin. longa. *Fructus* 2 poll. longus, $1\frac{1}{4}$ - $1\frac{1}{2}$ poll. crassus.

This is the largest-leaved of all the South African species, and somewhat approaches the Abyssinian *M. Schimperi*, Hochst., in foliage, but the flowers and fruit are very much larger. The leaves are not very coriaceous, but more of the substance of stout cartridge paper, and dry more or less of a greenish colour. According to a note from Mr. McKen, appended to an unlocalised specimen, the fruit is "of a

brownish colour like the Rose Apple." Like *M. dispar* (above described) it is also called "Amapumbulo" by the natives.

158. *Mimusops oleifolia*, *N. E. Brown* [Sapotaceæ]; ramis cinereis glabris, foliis petiolatis anguste lanceolatis utrinque angustatis apice obtusis basi acutis coriaceis glabris, floribus axillaribus solitariis, pedicellis quam petiolus subtriplo longioribus glabris vel primum minute adpresse puberulis, sepalis 8 biseriatis exterioribus lanceolatis acutis extus dense adpresse brunneo-pubescentibus intus minute puberulis interioribus lineari-lanceolatis acutis extus puberulis intus glabris ciliolatis, petalis 24 triseriatis 16 exterioribus lineari-lanceolatis acutis 8 interioribus multo majoribus lanceolatis acuminatis (siccis concavis marginibus subundulatis) glabris, staminibus 8 cum petalis exterioribus æquilongis antheris lineari-oblongis sublance apiculatis quam filamenta subulata pubescentia triplo longioribus, staminodiis anguste lanceolato-attenuatis acutis dorso marginibusque basi adpresse hirsutis, ovario ovoideo in stylo attenuato adpresse pubescente.

Habitat.—Natal, *Gerrard*, 1642.

Foliorum petioli 2–3 lin. longi, laminæ 1–2 poll. longæ, $2\frac{1}{2}$ –4 lin. latæ. *Pedicelli* 8–10 lin. longi. *Sepala* $3\frac{1}{2}$ lin. longæ, exteriora $1\frac{1}{4}$ lin. lata, interiora $\frac{2}{3}$ lin. lata. *Petala* exteriora $2\frac{1}{2}$ – $2\frac{3}{4}$ lin. longæ, $\frac{1}{2}$ lin. lata, interiora 3– $3\frac{1}{2}$ lin. longæ, 1 lin. lata. *Staminum filamenta* $\frac{3}{4}$ lin. longæ, antheræ 2 lin. longæ. *Staminodia* $1\frac{1}{2}$ –2 lin. longæ.

Very distinct in foliage from any other African species; the leaves in form and size resembling those of *Olea europæa*, L.

159. *Jasminum primulinum*, *Hemsl.* [Oleaceæ]; *J. nudifloro* valde affinis et hujus speciei forsitan varietas speciosissima, foliis tempore florente sæpius jam bene evolutis foliolis oblongo lanceolatis minute apiculatis margine scaberulo, corollæ tubo brevi lobis latis elliptico-rotundatis sese obtegentibus.

Habitat.—Western China: hedges and copses at Mongtse, Yunnan, *Hancock*, 6.

Foliola 1–2 poll. longæ, lateralia quam terminale minora. *Flores* $1\frac{1}{2}$ – $1\frac{3}{4}$ poll. diametro.

Whether this be entitled to rank as specifically different from *J. nudiflorum* or not, is a question that can hardly be answered without further knowledge of the two forms. It is possible that *J. nudiflorum* may have deteriorated in our climate; but there are no wild specimens in the Kew Herbarium to give evidence on this point. Generally speaking, cultivation increases the size of the flowers; yet the flowers of the wild specimens of our *J. primulinum* are nearly double the size of those of the cultivated *J. nudiflorum*. Mr. Hancock states that the flowers appear before the leaves, but in all of his specimens except one branch the leaves are fully developed with the flowers. A figure of this plant will shortly appear in Hooker's *Icones Plantarum*.

160. *Jasminum nummularifolium*, *Baker* [Oleaceæ]; sarmentosum, ramulis apice pubescentibus, foliis subcoriaceis trifoliolatis glabris foliolo terminali orbiculari, floribus in panículas laxas dispositis, ramulis dense pubescentibus, calycis dentibus lanceolatis tubo campanulato brevioribus, corollæ albæ tubo elongato cylindrico, lobis 5 oblongis tubo triplo brevioribus.

Habitat.—North Madagascar, *Rev. R. Baron* 6271.

Foliolum terminale 2 poll. longum et latum, petiolulo semipollicari. *Calyx* 2 lin. longus. *Corollæ* tubus pollicaris et ultra.

Nearly allied to the widely-spread tropical African *J. mauritianum*, Bojer, and the Chinese *J. paniculatum*, Roxb.; Ker in *Bot. Reg.* tab. 690.

161. *Jasminum octocuspe*, *Baker* [Oleaceæ]; sarmentosum, ramulis pubescentibus, foliis simplicibus oppositis breviter petiolatis ovatis acutis subcoriaceis glabris, venis primariis erecto-patentibus, floribus paucis axillaribus, calycis tubo campanulato glabro, dentibus 8 subulatis tubo longioribus, corollæ tubo cylindrico subpollicari lobis 8 lineari-oblongis tubo brevioribus.

Habitat.—Between Tamatave and Antanarivo, Madagascar, *Rev. R. Baron*, 6051.

Folia 2–2½ poll. longa, petiolo semipollicari. *Calyx* 4 lin. longus. *Corollæ* tubo subpollicaris, lobis 7–8 lin. longis.

Of this group of Jasmines with simple leaves there are between 20 and 30 species in tropical Africa. The present species is remarkable for its subulate calyx-teeth and is nearly allied to *J. Meyeri-johannis*, Engl. of Mount Kilimanjaro, and the Mombasa *J. tomentosum*, Knobl. in *Engl. Jahrb.* XVII., p. 536.

162. *Cryptolepis obtusa*, *N. E. Brown* [Asclepiadeæ]; caule volubili glabro, foliis petiolatis oblongis obtusis retusis vel emarginatis mucronatis glabris, cymis axillaribus vel ad apices ramorum anguste paniculatis pedunculatis laxe 6–10-floris, floribus pedicellatis glabris, sepalis ovatis subacutis, corollæ tubo brevi campanulato lobis lineari-lanceolatis triplo longioribus in alabastro contortis, coronæ lobis lanceolatis acuminatis ad medium corollæ tubi insertis.

Habitat.—South-east tropical Africa: lower valley of River Shire, *Meller*; Luabo River, *Kirk* 38; Shupanga, *Kirk*; between Tette and the coast, *Kirk*; Mozambique, *Forbes*; Delagoa Bay, *Speke*.

Foliorum petioli 2–5 lin. longi, laminæ ¾–3 poll. longæ, 4½–16½ lin. latæ. *Pedunculi* 1½ lin.–1 poll. longi. *Pedicelli* 1–2 lin. longi. *Sepala* ¾ lin. longæ. *Corollæ tubus* 1 lin. longus, lobi 3 lin. longi. *Coronæ lobi* ½ lin. longi.

163. *Raphionacme longifolia*, *N. E. Brown* [Asclepiadeæ]; omnino pubescens, caule simplice erecto, foliis petiolatis linearibus lineari-lanceolatis vel lineari-oblongis subobtusis vel obtuse apiculatis, cymis axillaribus subdensis multifloris brevissime pedunculatis, bracteis lanceolatis acutis, floribus pedicellatis, sepalis ovatis acutis, corollæ tubo campanulato quam lobi lanceolati acuti virides subtriplo brevior, coronæ lobis ad orem corollæ insertis tripartitis segmentis omnibus subulatis vel lateralibus deltoideo-lanceolatis segmento intermedio quam laterales 2–7-plo longiore apice tortuoso.

Habitat.—Zambesi region: Moramballa, 2000 ft., *Kirk*; Manganja Hills, *Kirk*.

Caulis 4–10 poll. altus. *Foliorum petioli* 2–4 lin. longi, laminæ 1¼–7¾ (sæpius 3–6) poll. longæ, 2–6 lin. latæ. *Pedunculi* 1–2 lin. longi. *Bractee* ½–1 lin. longæ. *Pedicelli* 1–3 lin. longi. *Sepala* ¾ lin.

longa. *Corollæ* tubus 1 lin. longus, lobi $2\frac{1}{2}$ –3 lin. longi. *Coronæ lobis* segmenta lateralia $\frac{1}{3}$ – $1\frac{1}{4}$ lin. longa, segmentum intermedium 2– $2\frac{1}{2}$ lin. longum.

164. *Raphionacme scandens*, N. E. Brown [Asclepiadæ]; caule longe scandente minute pubescente, foliis petiolatis oblongis oblanceolatis vel obovatis acutis vel breviter cuspidatis basi longe cuneatis obtusis minute pubescentibus siccis supra atroviridibus subtus cinereis, cymis plurimis axillaribus breviter pedunculatis vel subsessilibus densifloris pubescentibus, bracteis lanceolatis acutis, sepalis ovatis acutis pubescentibus, corollæ tubo breviter campanulato lobis patentibus oblongis obtusis extus pubescentibus intus glabris, coronæ lobis trifidis glabris segmentis omnibus subulatis intermedio apice tortuoso quam laterales quadruplo longiore, folliculis lanceolatis acuminatis minute puberulis.

Habitat.—Natal, Gerrard, 1312.

Foliorum petioli $1\frac{1}{2}$ –3 lin. longi, laminæ 2– $3\frac{1}{2}$ poll. longæ, $\frac{1}{2}$ –1 poll. latæ. *Pedunculi* 1–4 lin. longi. *Pedicelli* $1\frac{1}{2}$ –2 lin. longi. *Corollæ* tubus 1 lin. longus, lobis $2\frac{1}{2}$ lin. longis, $\frac{3}{4}$ lin. latis. *Coronæ lobis* 2– $2\frac{1}{4}$ lin. longi. *Folliculi* $1\frac{1}{4}$ –2 poll. longi, 5 lin. crassi.

165. *Raphionacme grandiflora*, N. E. Brown [Asclepiadæ]; caule erecto simplice (semper?) plus minusve hirta, foliis brevissime petiolatis basalibus subconfertis obovatis vel elongato-obovatis obtusis supremis distantibus lanceolatis vel lineari-lanceolatis acutis omnibus basi acute angustatis utrinque vel in nervis marginibusque tantum hirtis, pedunculis 1–2 ad apicem caulis terminalibus vel subracemosis 2–3 floris, bracteis linearibus vel subulatis hirtis, pedicellis hirtis, sepalis lanceolatis attenuatis hirtis, corollæ magnæ glabræ tubo campanulato lobis oblongo-ovatis subobtusis basi bicarinatis, coronæ lobis ad orem corollæ tubi insertis erectis rectangularibus tridentatis dentibus lateralibus brevissimis dente intermedio longitudine dimidium lobi æquante antico basi minute bidenticulato.

Habitat.—Tropical Africa: Tanganyika region, Niomkolo, Carson 5; Shire Highlands, near Blantyre, Last.

Caulis 10–12 poll. altus. *Folia* $1\frac{1}{4}$ – $4\frac{1}{2}$ poll. longa, $\frac{1}{4}$ –1 poll. lata. *Pedunculi* $\frac{1}{2}$ – $1\frac{1}{2}$ poll. longi. *Bracteæ* 3–5 lin. longæ. *Pedicelli* 4–7 lin. longi. *Sepala* 3–4 lin. longa. *Corolla* $1\frac{1}{4}$ poll. diam., tubo 3 lin. longo, lobis 7–8 lin. longis, 3–4 lin. latis. *Coronæ lobis* 5 lin. longi.

166. *Chlorocodon ecornuta*, N. E. Brown [Asclepiadæ]; caule scandente glabro, foliis petiolatis ellipticis breviter et abrupte cuspidatis basi obtuse rotundatis vel subcordatis glabris, stipulis reflexis grosse dentatis, cymis axillaribus pedunculatis laxis paucifloris glabris, bracteis oblongis obtusis apiculatis pedicellos amplectentibus, sepalis ellipticis vel rotundatis obtusissimis glabris, corolla subrotata glabra lobis oblongis obtusis, coronæ lobis transversis subbilobis vel late obovatis ecornutis.

Habitat.—South-east tropical Africa: Ribe, Wakefield.

Foliorum petioli $\frac{1}{2}$ –1 poll. longi, laminæ $3\frac{1}{2}$ –6 poll. longæ, $2\frac{1}{4}$ –4 poll. latæ. *Pedunculi* 1–2 poll. longi. *Cymæ* rami 8 lin.– $1\frac{1}{4}$ poll. longi. *Pedicelli* $\frac{1}{2}$ poll. longi. *Corolla* 9–10 lin. diam. *Coronæ lobis* $\frac{3}{4}$ –1 lin. longi, $1\frac{1}{2}$ – $1\frac{2}{3}$ lin. lati.

Similar to *C. Whitei*, Hook. f., but the coronal lobes are entirely destitute of the dorsal process characteristic of that species; the plant is more glabrous, the cymes or panicles apparently with fewer flowers, and the flowers dry a darker colour than those of *C. Whitei*.

167. *Tylophora oculata*, *N. E. Brown* [Asclepiadæ]; caule volubili gracili glabro, foliis distantibus petiolatis oblongo-lanceolatis acuminatis basi cordatis glabris, inflorescentiæ ramis quam folia brevioribus cymis umbelliformibus duabus instructis glabris, floribus pedicellatis pallide virentibus purpureo-oculatis, sepalis late ovatis acutis ciliolatis, corolla rotata vel campanulato-rotata lobis oblique oblongis apice breviter lacerato fimbriatis glabris, coronæ lobis radiatis subquadratis obtusis crassis glabris atropurpureis, apice styli prominente pyramidato-convexo albido-viridi.

Habitat.—Sierra Leone.

Foliorum petioli 4–7 lin. longi, laminæ 2–3½ poll. longæ, 1–1¼ poll. latæ. *Inflorescentiæ* rami 1½–3 poll. longi. *Pedicelli* 4–7 lin. longi. *Sepala* ½ lin. longa. *Corolla* 6 lin. diam., lobi 2 lin. longi et lati. *Coronæ* lobi ¼ lin. longi et lati.

Described from a living plant cultivated at Kew, raised from seeds collected by Mr. Scott Elliot in Sierra Leone.

168. *Cynanchum formosum*, *N. E. Brown* [Asclepiadæ], volubile omnino glabrum, foliis petiolatis ovatis elliptico-ovatis vel oblongo-ovatis subcuspidato-acuminatis basi cordatis lobis basalibus late rotundatis distantibus vel imbricatis, cymis lateralibus magnis pedunculatis laxè dichotomis multifloris foliis longioribus, floribus pedicellatis, sepalis ovatis acutis, corolla fere ad basin 5-lobata lobis oblongis obtusis patentibus vel reflexis pallide viridibus corona tubuloso-campanulata quinque-plicata 15-crenulata intus esquamata alba quam columna staminea duplo-longiore, folliculis lanceolato-fusiformibus glabris lævibus, seminibus ovatis concavo-convexis glabris brunneis comosis.

Habitat.—Peru: without locality, *McLean*; Arequipa, *Carson*, *Guillaume*; Huanta, and Huanuco, *Pearce*. Ecuador: Guayaquil, *Pavon*.

Foliorum petioli ½–1¼ poll. longi., laminæ 1¼–4 poll. longæ, ¾–2¾ poll. latæ. *Cymæ* cum pedunculo ½–2½ poll. longo 3–6 poll. longæ, 4–5 poll. latæ. *Pedicelli* 4–6 lin. longi. *Sepala* ¾–1 lin. longa, ½ lin. lata. *Corollæ* lobi 2½–3 lin. longi, 1½ lin. lati. *Corona* 2–2½ lin. longa. *Folliculi* 4–4½ poll. longi, 4–5 lin. crassi. *Semina* 3½ lin. longa, 1½ lin. lata.

This species is now in cultivation at Kew, having been raised from seeds that were sent in 1890 from Arequipa, in Southern Peru, by H. Guillaume, Esq., Consul General for Peru. It is remarkable that it has remained undescribed for so long, as it appears to have been in cultivation about 40 years ago; there being a garden specimen of it preserved in the Kew Herbarium, dated 1855. But probably it soon died out of cultivation, otherwise it would certainly have attracted the attention of some botanist, as it is one of the most distinct species in the genus, and the large, elegant cymes being freely produced, render it a rather ornamental plant from a horticultural point of view.

169. *Buddleia cuspidata*, *Baker* [Loganiaceæ]; ramulis sursum tomentosis, foliis breviter petiolatis oblongis cuspidatis crenatis basi cuneatis facie viridibus obscure pubescentibus dorso pallidis adultis pubescentibus junioribus tomentosis, spicis laxis axillaribus breviter pedunculatis simplicibus vel furcatis, calycis tubo campanulato dense tomentoso dentibus parvis ovatis, corollæ tubo cylindrico calyce triplo longiore lobis patulis parvis orbicularibus, staminibus in tubo inclusis.

Habitat.—North Madagascar, *Rev. R. Baron*, 6489.

Folia 6–8 poll. longa medio 3–3½ poll. lata. *Spicæ* 2–4½ poll. longæ. *Calyx* 1 lin. longus. *Corolla* 3 lin. longa. *Fructus* ignotus.

Nearly allied to *B. axillaris*, Willd., on which Radlkofer in *Bremen Abhandl.*, viii. 451, founds his genus *Adenoplusia*.

170. *Cordia Irvingii*, *Baker* [Boraginææ]; arborea, ramulis dense pubescentibus, foliis magnis longe petiolatis obovatis obtusis integris basi rotundatis facie viridibus glabratis dorso pubescentibus, floribus parvis in cymas scorpioideas densas longe pedunculatas paniculatas dispositis, calyce griseo-tomentosa tubo infundibulari verticaliter plicato dentibus parvis ovatis, corollæ tubo brevi, lobis oblongis, staminibus inclusis.

Habitat.—Interior of Western Lagos, near Abbeokuta, *Dr. Irving*, *Dr. Rowland*.

Folia inferiora 9–10 poll. longa, 6–7 poll. lata. *Calyx* 3–4 lin. longus. *Fructus* ignotus.

Near *C. Milleni* and *C. populifolia*, *Baker* in *Kew Bulletin*, 1894, p. 27.

171. *Ipomœa repandula*, *Baker* [Convolvulaceæ]; herbacea, caule gracili late volubili piloso, foliis longe petiolatis membranaceis magnis cordato-ovatis repandulis, utrinque tenuiter pilosis, floribus in axillis foliorum pluribus conglomeratis, pedicellis brevibus pilosis, bracteis minutis, sepalis ovatis acutis pilosis, corollæ parvæ albidæ limbo obscure 5-lobato.

Habitat.—Interior of Western Lagos, *Dr. Rowland*.

Folia 3–5 poll. longa et lata. *Sepala* 2 lin. longa. *Corolla* 6 lin. longa.

Belongs to the large section *Strophipomœa*, near *I. eriocarpa*, *R. Br.*

172. *Lepistemon leiocalyx*, *Stapf* [Convolvulaceæ]; caule volubili fulvo-hirsuto, foliis cordato-ovatis acuminatis interdum basin versus obscure trilobis utrinque fulvo-velutinis petiolo, ut pedunculi, fulvo-hirsuto, floribus numerosis umbellatim congestis, sepalis rotundato-ovatis obtusis glaberrimis, corolla flava tubo urceolato limbo brevi filamentis glabris, squamis basalibus papillosis, ovario disco alto cincto 2-loculari, loculis 2-ovulatis.

Habitat.—Frequent in the secondary forest near Keni, South Travancore, *T. F. Bourdillon*, 88.

Folia ad 2 poll. longa, 1½–2¼ poll. lata; petiolus 1–1½ poll. longus. *Pedunculus* 1–2½ poll. longus. *Pedicelli* ad 3 lin. longi. *Calyx* 2 lin. longus. *Corolla* 6 lin. longus.

The discovery of a representative of this genus in the South of the Deccan Peninsula is very interesting, as it is a link between the African and the Indo-Malayan area of the genus. There is only one species known from Africa, ranging almost over the whole tropical portion of the continent, whilst *Lepistemon Wallichii*, Chois. is distributed from the Khasia Hills and Assam to Borneo and the Philippines; *L. asterostigma*, K. Schum, is limited to New Guinea, and *L. Fitzaluni*, F. Muell., [Syn. *L. urceolatus*, F. Muell., and probably also *L. Lucae*, F. Muell.] to North Queensland. The species do not differ much, but it seems that *L. leiocalyx* approaches closer to the Indo-Malayan than to the African species.

173. *Brandisia racemosa*, Hemsl. [Scrophularinæ]; fruticosa, sarmentosa? ramulis floriferis gracilibus pubescentibus, internodiis quam folia brevioribus, foliis oppositis vel suboppositis petiolatis rigide papyraceis vel subcoriaceis ovatis oblongis vel rarius lanceolatis acutis crenato-serrulatis, serrulis apiculatis, basi rotundatis rarius subcordatis vel subcuneatis glabrescentibus, costa atque venis primariis paucis crassis subtus elevatis, floribus in racemos terminales elongatos dispositis, pedicellis in axillis bractearum oppositarum sæpius geminis brevissimis, bracteis foliis similibus sursum gradatim minoribus vel fere obsoletis, calycis campanulati lobis subæqualibus brevibus deltoideis obtusis, tubo extus puberulo intus valde hirsuto, corolla præcipue intus hirsuta insigniter inæqualiter bilabiata curvato-ventricosa, labio postico galeato-complicato breviter bilobato lobis rotundatis, labio antico brevissime tridentato dentibus lateralibus labio postico adhærentibus denti intermedio intermediis saltem dimidio brevioribus, staminibus 4 inclusis antheris barbatis per paria conniventibus, filamentis filiformibus glabris, ovario apice hirsutulo, stylo filiformi inter lobos labii superioris brevissime exserto, capsula (matura non visa) ovoidea calyce inclusa seminibus numerosissimis.

Habitat.—Western China: in shady copses, Mongtse, Yunnan, Hancock, 143.

Folia cum petiolo 1–2½ poll. longa; petiolus 1½–3 lin. longus. *Racemi* circiter semipedales; pedicelli 1–3 lin. longi. *Flores* 1–1¼ poll. longi. *Corollæ* tubus brevissimus; labium posticum dentem intermedium labii antici circiter 6–7 lin. superans.

Mr. Hancock describes this as having conspicuous, rich-red flowers; and, as they are borne in great profusion, this shrub must be very ornamental. It differs strikingly from the other known species in having racemose flowers, and in the very great inequality of the lips of the corolla, the upper lip being 6–7 lines longer than the middle lobe of the lower lip.

174. *Didissandra longipes*, Hemsl. [Gesneraceæ-Cyrtandrea]; fere undique glabra, caule, ut videtur, brevissimi gracili paucifoliato, foliis oppositis longissime petiolatis crassis vix coriaceis oblongis obovatis vel ovalibus obtusis undulatis subtus pallidis, venis primariis lateralibus utrinque sæpius 4 subtus sat conspicuis, pedunculis gracilibus elongatis terminalibus vel pseudoterminalibus apice 4–6 floris, pedicellis gracilibus, bracteis minutis, floribus speciosis, calycis segmentis fere liberis lanceolatis acute acuminatis, corolla tenuissima declinata, tubo curvato lato ventricoso, limbo 5-lobo inæqualiter bilabiato, labio antico

multo longiore, lobis omnibus rotundatis, staminibus 4 inclusis incurvis filamentis filiformibus glabris, antheris per paria coherentibus, ovario puberulo, stylo filiformi breviter exserto, capsula lineari recta puberula, seminibus minutis fere linearibus inappendiculatis.

Habitat.—Western China: in crevices of shady rocks, in a dark limestone glen, Mongste, Yunnan, *Hancock*, 50.

Folii lamina 2–4 poll. longa; petiolus $1\frac{1}{2}$ –3 poll. longus. *Pedunculi* 7–15 poll. longi. *Pedicelli* $\frac{1}{2}$ – $1\frac{1}{2}$ poll. longi. *Calycis fructiferi* segmenta 5–6 lin. longa. *Capsula* $1\frac{1}{2}$ –2 poll. longa.

Mr. Hancock does not describe the colours of the flowers of this evidently very elegant plant. All one can say from the dried specimens is that they are pale and spotted.

175. *Petrocosmea grandiflora*, *Hemsl.* [Gesneraceæ-Cyrtandreaë]; acaulis, caespitosa, foliis numerosis appressis longe vel longissime petiolatis mollibus papyraceis undique longe sericeo-pilosis oblongis lanceolatis ovatisve rarius fere orbicularibus vix acutis basi cuneatis vel interdum rotundatis, petiolo gracili, pedunculis gracilibus unifloris perraro bifloris medio bibracteatis, bracteis parvis linearibus, calycis segmentis fere liberis inæquilongis anguste lanceolatis acutis pilosis, corolla extus parvissime hirsutula obliqua inæqualiter bilabiata, labio postico multo minore, lobis omnibus latis rotundatis, staminibus 2 filamentis brevibus incrassatis hirsutis antheris magnis loculis connectivo incrassato hirsuto sejunctis, ovario hirsuto, stylo hirsuto gracili bis curvato id est rursum prorsum curvato, capsula ignota.

Habitat.—Western China: crevices of limestone precipices at 6400 feet, Mongste, Yunnan, *Hancock*, 115.

Folia maxima cum petiolo 6 poll. longa; lamina $\frac{1}{2}$ – $2\frac{1}{2}$ poll. longa. *Pedunculi* 1–2 poll. longi. *Calycis* segmenta $1\frac{1}{2}$ –2 lin. longa. *Corolla* $1-1\frac{1}{4}$ poll. diametro; labium anticum 10–12 lin. latum.

Mr. Hancock describes the flowers of this charming little plant as cobalt blue. The only other species known is *P. sinensis*, Oliv., in Hooker's *Icones Plantarum*, t. 1716.

176. *Vitex syringæfolia*, *Baker* (Verbenaceæ); fruticosa, glabra, foliis longe petiolatis simplicibus oblongis acutis integris basi rotundatis utrinque viridibus, floribus in cymas sessiles multifloras dispositis, pedicellis glabris, calyce campanulato viridi lobis parvis obtusis, corollæ tubo cylindrico, lobis obtusis tubo æquilongis.

Habitat.—Interior of Western Lagos, *Dr. Rowland*.

Folia 3–4 poll. longa, 2– $2\frac{1}{2}$ poll. lata. *Calyx* fructiferus 3 lin. longus. *Corollæ* tubus $1\frac{1}{2}$ lin. longus lobos æquans.

Allied to *V. simplicifolia*, Oliv. in *Trans. Linn. Soc.*, XXIX. 136, t. 130.

177. *Clerodendron cæruleum*, *N. E. Brown* [Verbenaceæ]; fruticosum, ramulis tetragonis junioribus bifariam puberulis senioribus glabris cinereis, plus minusve verrucoso-tuberculatis, foliis oppositis petiolatis ovatis ovato-lanceolatis vel suboblongis acutis basi cuneato-acutis utrinque grosse 3–4-dentatis raro integris supra et subtus ad nervos sparsissime pubescentibus marginibus ciliolatis nervis primariis

utrinque 3-5 subtus prominentibus, pedunculis axillaribus quam folia brevioribus gracilibus unifariam puberulis apice 1-vel 3-floris bracteatis, bracteis subulatis glabris, pedicellis brevibus patentibus vel subdeflexis glabris, calyce campanulato ad medium quinquifido glabro dentibus deltoideo-attenuatis acutis, corollæ tubo subrecto subcompresso calyce duplo longiore, limbo inæqualiter 5-lobo cæruleo lobo inferiore cuneato-obovato subtruncato lobis intermediis brevioribus ellipticis obtusis superioribus majoribus oblique ellipticis obtusis, staminibus styloque longe exsertis incurvis, fructu quadrilobo glabro.

Habitat.—South Africa: Natal, *Gerrard*, 1252, Mooi River Valley, 2000-3000 ft., *Sutherland*; Swaziland, *Mrs. K. Saunders*.

Foliorum petioli 1-6 lin. longi, laminæ 4 lin.-2½ poll. longæ, 2 lin.-1 poll. latæ. *Pedunculi* ¾-1¼ poll. longi. *Bracteæ* 1-1½ lin. longæ. *Pedicelli* 1-2 lin. longi. *Corollæ* tubus 3½ lin. longus, limbus 7-8 lin. diam. *Stamina* 8 lin. longæ.

Allied to *C. myricoides*, R. Br., but easily recognised by its much narrower and very acute calyx-teeth.

178. *Clerodendron polycephalum*, *Baker* [Verbenacæ]; fruticosum, erectum, ramulis validis dense ferrugineo-pilosis, foliis ternatis vel oppositis distincte petiolatis ovatis cordatis cuspidatis, integris utrinque viridibus pubescentibus, floribus in cymas multifloras conglomeratas pedunculatas terminales dispositis, pedunculis pedicellisque pubescentibus, calyce piloso tubo obconico dentibus ovatis tubo æquilongis, corollæ tubo cylindrico calyce 2-3-plo longiore, lobis parvis obovatis, staminibus elongatis.

Habitat.—Interior of western Lagos, *Dr. Rowland*.

Folia 3-4 poll. longæ, 2-2½ poll. latæ. *Calyx* 1½ lin. longus. *Corollæ* tubus 3-4 lin. longus, limbus expansus 1½ lin. diam.

Ranks amongst the small-flowered species of the subgenus *Euclerodendron* near *C. formicarum*, Gürke in Engl. *Jahrb.* XVIII. 179.

179. *Nepenthes Smilesii*, *Hemsl.* [Nepenthacæ]; parva, acaulescens? vel saltem ramulis floriferis interdum valde abbreviatis fere undique plus minusve puberulis, foliis confertis angustis utrinque attenuatis, ascidiis mediocribus recurvo-erectis fere cylindricis, costis anticis anguste alatis fimbriato-ciliatis vel fere obsoletis, calcare obsoleto, peristomio cylindræo transversim crebre costato, operculo fere orbiculari infra multiglanduloso, floribus ♂ ferrugineo-pubescentibus simpliciter racemosis, racemis longe pedunculatis, pedicellis brevissimis, perianthii segmentis ovalibus concavis, antheris 8 uniseriatis.

Habitat.—Northern Siam: grows on grass land on the ground, at Baw Saw, Nam Kawng, *F. H. Smiles*.

Lamina folii 4-6 poll. longæ. *Cirrhus* 1-2 poll. longus. *Ascidia* 2-3 poll. longæ. *Operculum* 9-15 lin. latum. *Scapus* 10-12 poll. altus.

Mr. Smiles describes this as having a green pitcher with a red cover and a red border.

180. *Ophiopogon clavatus*, *Wright* [Hæmodoracæ-Ophiopogoneæ]; herba, rhizomate gracili repente squamis sparse vestito, foliis aggregatis

subterminalibus petiolatis oblongis apice obtusis basi acutis 11-nerviis, racemis interfoliaceis paucifloris, perianthii segmentis exterioribus acutis interioribus quam exteriores latioribus dilute rubentibus marginibus undulatis, staminibus 6 filamentis brevibus antheris lanceolatis prope apices dehiscentibus, ovario infero triloculari, ovulis 2 in quoque loculo collateralibus, stylo filiformi.

Habitat.—China: Patung, *A. Henry*, 6065; Kuei, *A. Henry*, 6065A.

Petiolus 2 poll. longus; *lamina* 2–3 poll. longa, 6 lin. lata. *Perianthium* 9 lin. diam. *Antheræ* 3 lin. longæ. *Stylus* 4 lin. longus.

Allied to *O. dracænoides*, Hook. f., but differing in the shape of the leaves and the larger but less numerous flowers.

181. *Stemona erecta*, *Wright* [Roxburghiaceæ]; herba erecta, glabra, caule angulato, foliis verticillatis ellipticis cuspidatis vel breviter et subito acuminatis basi in petiolum brevem contractis trinerviis vel cum nervis arcte marginalibus 5-nerviis, nervis transversis pluribus approximatis, floribus in axillis cataphyllorum prope basin caulis, pedunculis floribus subæquilongis basi decurvis prope apicem recurvis floribus hinc erectis, perianthii segmentis anguste lanceolatis acutis 2 exterioribus 7-nerviis interioribus 9-nerviis, staminibus perianthii segmentis paullo brevioribus filamentis brevibus, antheris linearibus cum connectivo in appendicem planam anthera longiorem producto, ovario uniloculari, ovulis 3–6 erectis.

Habitat.—China: Nanking, *C. Schmidt*, 1541, *Herb. Faber*.

Folia 2–2½ poll. longa, 1 poll. lata. *Perianthii* segmenta 6–7 lin. longa.

The nearest ally of this species is *Stemona sessilifolia*, Miq., figured in the *Somoku Zusetsu*, Vol. II., t. 55, which also has the leaves arranged in whorls of fours, but differs in having the flowers on much longer pedicels and solitary from the axils of fully developed leaves.

182. *Smilax scobinicaulis*, *Wright* [Liliaceæ-Smilaceæ]; frutex ramosus, ramis canaliculatis spinis tenuibus atris vestitis, foliis ovatis acutis glabris 7-nerviis, stipulis ad petiolum adnatis apice cirrhiferis, pedunculo quam petiolus multo brevior, pedicellis circa 8, floribus ignotis, perianthio persistente normali, bacca globosa.

Habitat.—China: Hupeh, *A. Henry*, 6554.

Folia 5 poll. longa, 3 poll. lata; *petiolus* 1 poll. longus. *Pedicelli* 3 lin. longi. *Bacca* 4 lin. diam.

Readily distinguished from the other Chinese species by the numerous black, fragile prickles, which clothe the stem, as in some forms of *Smilax californica*, A. Gr. (*Watson, Bot. Calif.* ii., p. 186).

183. *Smilax microphylla*, *Wright* [Liliaceæ-Smilaceæ]; suffruticosa, canle ramosissimo plus minusve angulato spinis parvis vestito, foliis oblongis subacutis glabris subtus glaucescentibus 3–5 nerviis, floribus ♂ circa duodecim, segmentis perianthii recurvis interioribus quam exteriores angustioribus, staminibus 6 antheris albis, rudimento ovarii nullo, floribus ♀ non visis, bacca globosa nigra parva 1-sperma.

Habitat.—China: Hupeh, Ichang, *A. Henry*, 1521, 3089, 3089A, 3980, 3996, 4410.

Folia 1-1½ poll. longa, 3-10 lin. lata; *petiolus* 2 lin. longus. *Pedunculus* 2 lin. longus; *pedicelli* 5 lin. longi. *Bacca* 3 lin. diam.

This appears to be related to *Smilax obtusa*, Bth., from Mexico. It can be distinguished from the other Chinese species by its small, glaucous, somewhat coriaceous leaves.

184. *Smilax* (*Eusmilax*) *flaccida*, *Wright* [Liliaceæ-Smilaceæ]; suffruticosa, ramosa, inermis, foliis lanceolatis acuminatis rectis vel leviter curvatis glabris nervis primariis 3-5 ultimis reticulatis conspicuis, petiolis vix vaginatis cirriferis, inflorescentia umbellata, ♂ floribus circa duodecim, segmentis perianthii ligulatis, staminibus 6 filamentis filiformibus quam perianthium paulo brevioribus, rudimento ovarii nullo, inflorescentia ♀ floribus circa 6, perianthio masculo simili sed segmentis sæpe plus minusve per paria adhærentibus, ovario triloculari, ovulis geminatis, stigmatibus 3 subsessilibus, fructu ignoto.

Habitat.—China: Hupeh, Ichang, *A. Henry*, 3630, 3630A, 3630B.

Folia 3 poll. longa, ½-1 poll. lata; *petiolus* 3-6 lin. longus. *Pedunculus* ♂ 1 poll. longus; ♀ 6 lin. longus; *pedicelli* ♂ et ♀ 3 lin. longi. *Perianthium* 3 lin. longum.

The leaves of this plant somewhat resemble those of *S. parrifolia*, Wall., but the stem has not the same zigzag habit.

185. *Smilax* (*Eusmilax*) *megalantha*, *Wright* [Liliaceæ-Smilaceæ]; fruticosa, caule flexuoso leviter sulcato paucis spinis brevibus compressis armato, foliis ovatis acutis subtus glaucescentibus nervis primariis 3, petiolo usque ad medium vaginato, vagina apice cirriferâ, corymbo subumbellato ad axillam folii rami lateralis producto, bracteolis subulatis, flore ♂ perianthio 6-partito, segmentis lanceolatis acuminatis exterioribus quam interiores latioribus, staminibus 6, filamentis filiformibus quam perianthii segmenta brevioribus, flore ♀ non viso, fructu globoso sæpius 1-spermo.

Habitat.—China: Szechuen, *Pratt*, 811; Mt. Omei, *Faber*, 241.

Folia 3½ poll. longa, 2 poll. lata; *petiolus* 1 poll. longus. *Perianthium* 6 lin. longum. *Fructus* 6 lin. diam.

This species somewhat resembles *Smilax stenopetala*, A. Gr., but differs in the inflorescence, which, instead of arising directly from the axil of a mature leaf, consists of a contracted raceme borne in the axil of a very young leaf, rarely an inch long, situated on an axillary branch about 4 inches long, at the base of which a large bud-scale persists opposite to the leaf-sheath.

186. *Paradisica minor*, *Wright* [Liliaceæ-Asphodeleæ]; herba rhizomate brevissimo, foliis radicalibus linearibus acutis leviter carinatis glabris, scapo erecto racemoso, bracteis late triangularibus membranaceis, pedicellis brevibus, perianthio campanulato segmentis albis membranaceis oblanceolatis marcescentibus, staminibus quam perianthii segmenta paulo brevioribus, antheris elongatis curvatis basi bilobis dorsifixis versatilibus, ovario ovoideo, ovulis pluribus, stylo filiformi staminibus æquilongo.

Habitat.—China: Yunnan, at 6000 ft., *W. Hancock*, 94.

Folia 8 poll. longa, 4 lin. lata. *Scapus* $1\frac{1}{2}$ ped. longus. *Pedicelli* 3 lin. longi. *Perianthium* 1 poll. longum. *Filamenta* 4 lin. longa; *antheræ* 5 lin. longæ. *Stylus* 9 lin. longus.

187. *Allium* (*Rhiziridium*) *Henryi*, *Wright* [Liliaceæ-Alliæ]; herbaceum glabrum, rhizomate perpendiculari fibris reticulatis dense vestito, foliis linearibus acuminatis quam scapus paulo longioribus, scapo tenui glabro vel leviter pubescenti flores 5-7 gerente, spatha scariosa ventricosa apice acuminata quam pedicelli dimidio brevior, segmentis perianthii ovatis acutis cæruleo-purpureis, filamentis basi breviter connatis quam perianthium vix longioribus iis staminum interiorum dentibus lateralibus brevibus instructis, ovario trilobo, stylo quam perianthium sesquolongiore.

Habitat.—China: Hupeh, Hsingshan, *A. Henry*, 6924.

Rhizoma 5 poll. longum. *Scapus* 8 poll. longus. *Pedicelli* 6-8 lin. longi. *Perianthii* segmenta 3 lin. longa, $1\frac{1}{2}$ lin. lata.

This is allied to *Allium przewalskianum* β *planifolium*, Rgl., from which it differs in having longer leaves and pedicels, a shorter broader spathe, and fewer flowers.

188. *Aloe Buchanani*, *Baker* [Liliaceæ]; acaulis, foliis productis 8-10 lineari-subulatis distichis confertis facie profunde canaliculatis dorso rotundatis sæpissime prope basin minute albo-maculatis, aculeis marginalibus paucis minutissimis, scapo simplici elongato bracteis pluribus vacuis parvis ovatis adpressis prædito, racemo denso paucifloro, pedicellis longissimis ascendentibus, bracteis parvis ovatis viridibus imbricatis, perianthio cylindrico pallide rubello sursum viridulo, tubo brevissimo, lobis linearibus, genitalibus perianthio æquilongis.

Habitat.—Tropical Africa: Shiré highlands, *Buchanan*. Described from a plant that flowered at Kew, December 1894.

Folia pedalia vel sesquipedalia basi 6-7 lin. diam. *Scapus* sesquipedalis. *Pedicelli* $1\frac{1}{2}$ -2 poll. longi. *Bracteæ* 5-6 lin. longæ. *Perianthium* pollicare.

Very near *A. Cooperi*, *Baker* (*Bot. Mag.*, tab. 6377), from which it differs by its smaller flowers and leaves rounded on the back.

189. *Dipcadi occidentale*, *Baker* [Liliaceæ]; bulbo magno subgloboso tunicis exterioribus membranaceis brunneis, foliis linearibus firmis planis, syanthiis glabris, pedunculo gracili elongato, racemo laxo paucifloro subsecundo, pedicellis brevibus ascendentibus, bracteis parvis ovatis, perianthio viridi, tubo oblongo lobis interioribus lineari-oblongis erectis, exterioribus complicatis falcatis interioribus paulo longioribus.

Habitat.—Tropical Africa: near Wallis, Scarcies, on hard dry laterite, *Scott Elliot*, 4840 (Sierra Leone Boundary Commission).

Bulbus 2 poll. diam. *Folia* semipedalia 3-4 lin. lata. *Scapus* 4-6 pollicaris. *Racemus* 2-6 florus, 1-3 poll. longus. *Pedicelli* $1\frac{1}{2}$ lin. longi. *Perianthium* 6 lin. longum, lobis exterioribus 2-3 lin. longis.

Allied to the Abyssinian *D. tacazzeanum* and *unifolium*.

190. *Alocasia æquiloba*, *N. E. Brown* [Aroideæ]; omnino glabra, foliorum petiolo quam lamina longiore pallide viridi, lamina hastato-sagittata lobo terminalo oblongo apice breviter cuspidato acuto margine

undulato-sinuato lobis basalibus oblongo-lanceolatis obtusis antico sub-æquilongis sinu hyperbolico late sejunctis integris pagina superiore viridi nitida inferiore pallide viridi, costæ anticæ nervis utrinque 4-6, costarum posticarum nervis 3-6 exterioribus 2-3 interioribus omnibus utrinque parum prominentibus, pedunculo tereti pallide viridi, spathæ tubo anguste ellipsoideo-oblongo antice plano dorso convexo viridi nitido quam lamina oblonga acuta reflexa marginibus revolutis duplo brevior omnino viridi extus nitida, spadice quam spatha multo brevior parte fertili quam appendice tereti subobtusâ levi ochracea sublongiore, ovariis subaxis 6-7-cyclis globoso-ellipsoideis stylis brevibus stigmatibus parvis 3-lobis pallidissime flavo-viridibus, organis neutris floribusque masculis ochraceis.

Habitat.—German New Guinea.

Foliorum petioli 1-2 ped. longi, lamina petiolo æquilonga, lobo terminali 7-12½ poll. longo, 3-6 poll. lato, lobis basalibus 6½-11½ poll. longis, 1¾-2½ poll. latis. *Pedunculus* 9 poll. vel ultra longus. *Spathæ tubus* 1¼ poll. longus, 5 lin. crassus, lamina 2½ poll. longa, 11 lin. lata. *Spadix* 2¾ poll. longus, parte feminea 6 lin. longa, neutra 6 lin. longa, mascula 7 lin. longa, appendice 14 lin. longa, 2 lin. crassa.

A very distinct species, intermediate between the entire-leaved kinds and those which have pinnatifid leaves, like *A. sanderiana*, Bull. and *A. Portei*, Engl. It has been introduced into cultivation by F. Sander & Co., to whom Kew is indebted for a dried and a living leaf and inflorescence, from which the above description was made. The inflorescence was from a small plant, and it doubtless attains larger dimensions than those given above.

CCCCLVIII.—MISCELLANEOUS NOTES.

The death of the celebrated horticulturist, Mr. J. W. THOMSON, at the ripe age of 90, is recorded in the *East Sussex News* for Friday April 5, 1895. He was educated at Shrewsbury Grammar School, the late Charles Darwin being a fellow pupil, and he was employed in the Royal Gardens under Mr. Aiton in 1819. He afterwards became head gardener at Syon House, the residence of the Duke of Northumberland. In 1835, after five years' service at Syon House, he went into business as a nurseryman. Last year he paid a visit to Kew, and shortly afterwards wrote the following letter. The Kew Guild is an Association of Kew Gardeners, Past and Present, formed in 1893. It publishes annually a journal for circulation among its members, and the number for 1894 contains a portrait of Mr. Thomson, with a very interesting paper by him, entitled "Reminiscences of an Old Kewite."

Hortulan Lodge, Hayward's Heath,

SIR,

November 1, 1894.

WHEN visiting Kew Royal Botanic Gardens, September 11th, I omitted to inform you that by my will I had arranged and invested a sufficient sum in the New South Wales Stock, now paying 3½ per cent., as would realise annually five guineas, my present contribution (a mere mite) towards the expenses incurred annually by the publication of the Kew Guild, which is to be paid every year on my birthday, the 25th

day of March, as a donation in perpetuity, and for all time, as a gift from J. W. Thomson, in 91st year; the Stock will stand in the name of the director for the time being.

I also intend, so long as the Almighty in his great goodness permits me to occupy a *locus standi* in boundless space, also to perambulate *terra firma*, to contribute my annual donation of five guineas to the Guild.

I am, &c.,
(Signed) J. W. THOMSON.

W. T. Thiselton-Dyer, Esq.,
C.M.G., C.I.E., F.R.S., Ph.D., F.L.S.

News was received with great regret at Kew in March last of the death of Mr. WILLIAM CROWTHER, who for the last four years has been the able and efficient curator of the Botanic Station at Aburi, on the Gold Coast. Mr. Crowther was appointed in 1889 (*Kew Bulletin*, 1891, pp. 169-173). He fully justified the selection for the post, and, as shown in these pages (*Kew Bulletin*, 1892, pp. 14 and 297; 1893, pp. 160-62), the station at Aburi, covering nearly forty acres of land, had been admirably planned and was established with valuable economic trees and shrubs brought together from all parts of the world. In addition, there were large nurseries for supplying seedling plants of coffee, cacao, and spices to the natives for starting new industries. In the work of the station the curator had from the first the judicious and sympathetic guidance of Sir William Brandford Griffith, K.C.M.G., to whom indeed it owes both its inception and success.

In 1893 Mr. Crowther visited the West Indies to observe the cultivation of coffee, cacao, and other tropical economic plants. On his return he prepared a very interesting report giving an account of his mission, pointing out the special subjects likely to be successfully cultivated in West Africa (*Kew Bulletin*, 1894, p. 227).

Mr. Crowther's removal is a great blow to botanical enterprise in this part of the world. The station at Aburi is at an elevation of 1500 ft., and attached to it is a sanatorium for European officers. The locality is, therefore, regarded as comparatively healthy. From a despatch addressed to the Colonial Office by Sir W. Brandford Griffith, it appears that Mr. Crowther died from abscess of the liver. His Excellency, who was at Aburi at the time, adds, "I saw him frequently during his illness. He gradually sank and died on the 16th March. His remains were interred in the cemetery at Accra, his funeral being largely attended by several public officers and others who regretted his untimely death. By this sad event the Government has lost one of its most valuable officers."

Botanical Magazine.—The most remarkable plant represented in the number for March is *Weldenia candida* (Lampra volcanica), a member of the *Commelinaceæ*, referred to in the *Bulletin* for 1894, p. 135, on the occasion of its flowering at Kew. It has a curious history, which is not fully given in the notes in question. Dr. J. H. Schultes, junior, first described it, in 1829, from specimens purporting to have been

collected by Karwinski in the Nevado de Toluca, Mexico, and two other Mexican localities are recorded; yet it appears that no recent collector has met with it in Mexico, and there are no Mexican specimens at Kew. Hartweg collected it in the Volcan de Agua, Guatemala, in 1837, and the late Mr. Bentham shortly afterwards described and published it under the second name cited above. From that date until 1893 it would seem that this singular plant had not been re-discovered, and then it was found in the same locality where Hartweg collected it. Evidently it is an exceedingly rare plant. *Heptapleurum venulosum*, var. *erythrostachys* (Araliaceæ) is a small tree with a bright red inflorescence, which flowered in the Temperate House. The plant was presented to Kew by M. de Falbe, formerly Danish Minister to the Court of St. James. *Disa sagittalis*, a relatively inconspicuous South African orchid, was presented to the Royal Gardens by H. J. Elwes, Esq. *Veronica loganioides*, one of the numerous New Zealand species, flowered in the Rock Garden at Kew in 1893; and *Schinus dependens* (*Duvaua dependens*), a native of Chili, is a hardy shrub of no great ornamental character, though a conspicuous object when covered with a profusion of its small yellow flowers. It was raised at Kew from seed obtained from the Botanic Garden of Santiago.

The April number consists entirely of plants that have flowered at Kew. *Macaranga portiana* (Euphorbiaceæ) is a native of the Philippine Islands, where it was discovered by Mr. Marius Porte, and after whom it is named. A young plant was sent from the Jardin des Plantes, Paris, in 1892, and it has long been a very striking object in the Victoria House. *Saintpaulia ionantha* is a charming little cyrtandrous plant from the mountains of eastern tropical Africa. It so strongly resembles the Chinese *Petrocosmea* that it has been somewhat prematurely reduced to this genus. The Kew plants were raised from seed obtained from a continental nurseryman. *Ixianthes retzioides* (Scrophulariaceæ) is an exceedingly rare, indeed, almost extinct, South African shrub, having large yellow flowers. Plants were raised at Kew from seed sent in 1891 by Prof. MacOwan, Government Botanist at Capetown. *Piptospatha Ridleyi*, a small aroid, discovered in Johore, and sent to Kew by Mr. H. N. Ridley, Director of the Garden and Forest Department of the Straits Settlements. *Magnolia parviflora*, a native of Japan, was figured from a plant, obtained from Yokohama, which flowered in the Arboretum last June.

Hooker's *Icones Plantarum*.—The third part of the fourth volume, (fourth series) appeared in April, and contains, among other things, figures of the principal rare plants of Mr. Bent's Hadramaut expedition, described in the *Kew Bulletin*, 1894, pp. 328-343. A second figure of the very singular Chinese tree, *Eucommia ulmoides*, Oliv., represents both male and female flowers, which were previously unknown. Professor D. Oliver now refers it to the neighbourhood of *Trochodendron*. Another very anomalous plant figured is *Circæaster agrestis*, Maxim. It was at first suggested that its affinity lay in the direction of the Chloranthaceæ, but Professor Oliver is now inclined to regard it as a degraded type of the Ranunculaceæ, though in habit it is exceedingly different. *Achilus*, the proposed new genus of Scitamineæ (*Kew Bulletin*, 1895, p. 39), is figured; and Dr. H. Baillon has since sent specimens of what is apparently a second species from Cambodia, which seem to indicate that the flowers figured are imperfect or abnormal. It

is expected, however, that Mr. Smiles will send fuller material, when the structure will again be investigated. The remainder of this part of the *Icones* is chiefly devoted to African plants.

Organization of the Fossil Plants of the Coal-Measures.—Professor W. C. Williamson, and Dr. D. H. Scott, the honorary keeper of the Jodrell Laboratory, are the authors of an elaborately illustrated article on the minute structure of the *Calamites*, *Calamostachys* and *Sphenophyllum*, lately published in the *Philosophical Transactions* of the Royal Society of London. The leading idea was to elucidate the structure of fossil plants by exact comparison with the structure of living plants. The paper opens with a detailed comparison of the primary structure of the stem of *Calamites* with that of the stem of *Equisetum*, followed by an account of the secondary growth and branching. Homosporous and heterosporous species of *Calamostachys* are described; and it is suggested that we have here a genus in which the first rise of the phenomenon of heterospory can be traced. In the discussion on the affinities of *Sphenophyllum* it is stated that the structure is now known throughout with great accuracy, that its position still remains an isolated one, and that it is a cryptogamous type not represented in the existing flora. The illustrations are exceedingly good, especially those reproduced from Mr. George Brebner's beautiful drawings.

Himalayan Rubi.—In the *Kew Bulletin*, 1894, p. 196, a note was published respecting a Himalayan *Rubus* cultivated at Kew, that had proved of special interest in Queensland. This was *Rubus ellipticus*, Smith (*R. flavus*, Ham.). The fruit is of "a pale yellow colour when ripe, and possesses the full raspberry flavour with a delightful sub-acidity which renders it most palatable." The plant has now also been introduced to Jamaica, where no doubt it will flourish at the Hill Garden in the Blue Mountains. The distribution of these temperate Himalayan *Rubi* under cultivation, is a fact of some interest. *R. biflorus*, Ham., a strong rambling shrub, with the stem and branches white with glaucous bloom grows in the open air at Kew, while another species the very variable *R. lasiocarpus*, Smith, with the leaflets hoary with white tomentum, flourishes at the Glasnevin Botanic Gardens. In Mr. Fawcett's interesting report for the year 1894, just issued, it is further recorded that *Rubus racemosus*, Roxb., which he calls the "Himalayan Blackberry," has been a success in Jamaica and plants have been distributed. Sir Joseph Hooker (*Flora of British India*, ii., p. 340), regards this species as an extreme form of *R. lasiocarpus*, Smith, readily distinguished by the copious glandular bristles and hairs, the usually densely tomentose branches, corymbs, petioles, &c., and the prickly calyx and large petals; the leaflets too are usually broader, very coriaceous, glabrous above or with sometimes copious almost woolly hairs. The petals are large and red.

Rubus moluccanus, widely distributed in India and ascending to an altitude of 7,000 feet in the Sikkim Himalaya, is a robust climber with palmately lobed leaves nearly a foot in diameter. There is a specimen of it in the temperate house at Kew, where its stems, often 40 feet long, hang from the gallery.

Another Himalayan *Rubus* now widely distributed in different parts of the world is *Rubus rosæfolius*, Smith (*Bot. Mag.*, t. 6970). Aiton in the second edition of *Hortus Kewensis* says that it was introduced to this country by Sir Joseph Banks from the Cape of Good Hope and St. Helena. Sir Joseph Hooker found it abundant in the latter island in 1840. According to Mr. Baker (*Flora of Mauritius*, p. 96) it was introduced to that island from the Malay Archipelago in 1780. It is now found also in many of the West Indian Islands, especially in Martinique and Dominica. Dr. Nicholls, F.L.S. (*Kew Bulletin*, 1888, p. 207), includes it under the fruits of Dominica. It is known there as Fraîsè or Red-berry. He adds "this fruit, which evidently escaped from cultivation many years ago, is now wild and occurs abundantly along the roadsides in several districts of the island. By careful cultivation it might be so improved as to make a very fine fruit; but in its wild condition it is too full of seeds to entitle it to take high rank. It is eaten with cream like strawberries and is also made into jam."

Rubus rosæfolius is often cultivated in gardens where its evergreen foliage, the delicate white of the petals and above all the red fruit, copiously produced, render it very attractive. There is a variety (*R. rosæfolius* var. *coronarius*) with double white flowers (*Bot. Mag.*, t. 1783) cultivated as a garden shrub in Japan, and sometimes seen in greenhouses in this country.

Supplement to Pritzel's Inconum Botanicarum Index.—Since the publication of the original work it has been the practice at Kew to enter in an interleaved copy references to all figures of plants as they are published; at least so far as it could be done. Some monographs, such as those in the *Annals of the Calcutta Botanic Garden*, in which figures are given of all the Indian species, have not yet been entered. Sargent's *Silva* of North America is another instance; but in each case little difficulty is experienced, because all the species are figured and systematically arranged. Nevertheless, it is desirable that they should eventually be entered, because it is not every botanist that is aware of the existence of these books.

Last year Dr. Balfour, the Regius Keeper of the Edinburgh Botanic Garden, obtained the sanction of the authorities to have a transcript made of all the manuscript additions in the Kew interleaved copy of Pritzel, for the use of the Edinburgh establishment. This was accordingly done; a strictly alphabetical arrangement being followed. It was evident that great convenience and saving of time would be gained by duplicating this for Kew. The manuscript entries in the Kew Pritzel are in a variety of hands, some of them not very legible, very much crowded in some places, and not in one alphabetical sequence. Consequently it was decided to have three type-written copies made; one each for Calcutta, Kew and Edinburgh; each establishment paying a third of the cost of production. This Kew Supplement was completed by the end of February, and contains upwards of 50,000 entries. During the time the work was in progress about 1,000 entries accumulated, and these have been added in the blank columns left for the purpose of containing the additions.

Newfoundland Plants.—Through Dr. B. L. Robinson, Curator of the Gray Herbarium, Harvard, Kew has received a set of about 260 species of dried plants, including a number not recorded from the island in any of the existing lists, the most complete of which is embodied in Macoun's Catalogue of Canadian Plants. One of the most striking features in the relatively poor flora of Newfoundland is formed by the numerous *Vacciniaceæ* and *Ericaceæ*, especially the prostrate, shrubby, berry-bearing kinds, which clothe the swamps and open woods. Macoun enumerates upwards of twenty species belonging to the two natural orders in question.

North Mexican Plants.—Kew has acquired by purchase a collection of dried plants, numbering about 550 species, collected by Dr. C. Lumholtz. They are from the Sierra Madre region in the north-west, where Seemann collected forty-five years ago. There is a considerable number of novelties including a *Pinus* and a *Bravoa*—*Amaryllidaceæ*.

Orange-Growing in Florida and Jamaica.—The recent very cold weather in the Southern United States appears to have had a very destructive effect upon the orange trees, pine apples, and other sub-tropical plants cultivated in Florida. This is a matter of more than local interest for a large number of Englishmen have settled in the State, and much money and labour have been expended in establishing large and hitherto flourishing orange groves. The *Garden and Forest* (February 13, 1895, p. 70) states: "The second period of freezing weather in Florida was even more disastrous to the orange groves than the first, when, as we have stated before, the crop of fruit was practically destroyed. The older trees, which had not been killed had begun to put forth leaf-buds and fruit-buds, and this second cold wave has evidently destroyed these and apparently ruined the next crop." In a later number (February 27, p. 90,) the same authority remarks: "But for the disastrous periods of zero weather which desolated the orange groves of Florida, the New York market would now have been well supplied with fruit from that State. Probably the number of oranges destroyed in Florida would amount to as many as the entire California crop, which is arriving under the most favourable conditions for profit to the growers." Dr. Mead quoted in the *Gardeners' Magazine* (March 9, 1895), furnishes further particulars: "All early vegetables, as well as the whole crop of oranges, are ruined; one hundred thousand boxes of strawberries which would have been shipped between February 20 and March 10 are destroyed. Fine apples have been nearly all destroyed. This serious frost coming after the previous destruction of the orange crop means absolute ruin to the Florida growers as now there will be no crop next year, if indeed, Florida is not permanently disabled in the matter of citron culture."

The effect on garden plants was equally destructive. The following extract is taken from a very interesting letter addressed to Kew, on the 25th February last, by Mr. H. Nehrling, of the Public Museum, Milwaukee:—"In my South Florida garden, south of latitude 28, almost all my plants were killed by the great freezes on December 28 and February 7. The temperature fell as low as 16° F. above zero. Thousands and thousands of orange trees were killed, and most of

my tropical plants such as *Pleroma*, *Meyenia*, *Hibiscus*, *Araucaria*, *Bignonia*, *Cestrum*, *Iochroma*, *Melaleuca*, *Metrosideros*, *Tabernaemontana*, &c., &c., were hurt beyond recovery. Even such plants as *Daphne adnata*, *Clethra arborea*, *Hydrangea hortensis*, *Myrtus communis*, *Nerium Oleander*, *Illicium religiosum*, *Michelia fuscata*, *Gardenia florida*, &c., &c., were killed to the ground. The species of *Phœnix* lost all their leaves, while most of the *Cocos* and *Sabals* were only slightly injured. *Acrocomia Totai* lost many of its leaves and even *Chamærops humilis* suffered a little.

"I think the plants of Southern Japan and China will be grown more in the gardens of Florida in future as they are perfectly adapted to the soil and climate."

One effect of the disaster that has overtaken Florida in the matter of oranges is to turn the attention of growers to the advantages possessed by Jamaica and the other islands in the West Indies for fruit growing. In the speech by Sir Henry Blake, K.C.M.G., at the opening of the Legislative Council of Jamaica on February 12, he said :

"I have received from Florida several applications for information as to the prospects of orange-growing, from persons whose groves have been ruined by the late severe frost, and who realise the precarious nature of the fruit industry in that State on account of the periodical cold waves from which it has suffered. I have directed that the fullest information shall be prepared for transmission to the inquirers. From the excellence of the Jamaica orange, grown as it is without cultivation or care, it is evident that with a soil and climate especially suited to the growth of the citron tribe this Island could with systematic cultivation produce enormous crops of oranges, lemons, grape-fruit and shaddock equal in quality to that of any fruit in the American or European market. I shall welcome the introduction of a regular cultivation that ought to be as valuable and as stable as the cultivation of sugar or bananas."

It is probable that the influx of a few capable men from Florida, with good experience in growing and packing oranges might be of signal service to Jamaica. A more careful cultivation and selection of the best sorts of oranges for export purposes from Jamaica have been urged from Kew for many years. In a recent letter addressed to the Colonial Office the following remarks were made :—"It has always been a matter of extreme surprise that the export of oranges from Jamaica has made so little progress of late years. It is stated, on trustworthy authority, that those already grown are superior to those produced in Florida, and a good market might be found for them in the United States and the United Kingdom. To stimulate this industry, amongst other steps, a small intermediate garden should be started on the orange zone at 2-3,000 ft. elevation. Here the best obtainable kinds might be grown, their cultural treatment demonstrated, and instruction given in the proper modes of handling and packing." It might be added that the Botanic Gardens in Jamaica have for a long period endeavoured to encourage an orange industry in the island. From the returns furnished in the Annual Reports it appears that orange plants at the rate of 10,000 to 50,000 a year have been distributed at nominal rates. Also lemons, citron lemons, and the best Mandarin and Tangerine oranges. Jamaica has now an exceptional opportunity, and it should take advantage of the present circumstances and endeavour to establish an orange industry as one of the chief staples of the island.